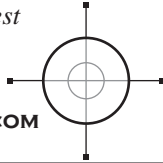


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ACT Math Flash Cards

*Formulas, definitions, and concepts
for success on the ACT Mathematics Test*



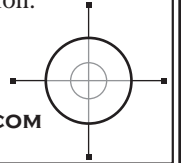
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How to Study Math Flash Cards

Review each card, and remove any formulas that you already know. Study only the cards with formulas that you have not yet memorized. To increase your retention of the formulas, try these study methods:

- 1. Write out the formulas and their components.**
Transferring the formulas to paper helps transfer the information into your long-term memory.
- 2. Group formulas by content area.**
By placing the cards in groups, such as “Circles” or “Transformations,” you can begin to see connections between formulas that may help with memorization.

(Continued on back of card)



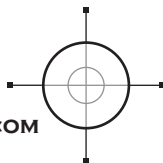
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Order of Operations

A fundamental principle of all math is the order of operations. This rule sets precedence for which operations are performed first when solving or simplifying expressions and equations. The six operations are addition, subtraction, multiplication, division, exponentiation, and grouping, and their order of precedence is often remembered using the acronym PEMDAS.

Each of the letters in PEMDAS represents an operation and its order of priority:

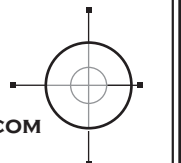
P arentheses (grouping)	1st
E xponents	2nd
M ultiply	3rd
D ivide	3rd
A dd	4th
S ubtract	4th



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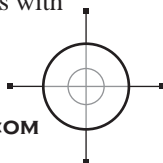
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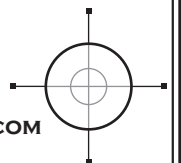
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- ⊕ 4 point score increase guarantee
- ⊕ 95th percentile instructors
- ⊕ Over 1400 pages of course material
- ⊕ Online Student Center Access
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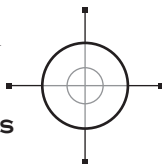
How to Study Math Flash Cards

3. Write sample questions that require each formula.

You can find existing questions from *The Real ACT Prep Guide* grouped by content in the Red Book Database on the book owner's website. Use these questions to write your own example questions, along with detailed solutions to your questions. The most effective strategy for learning information is to teach the information to someone else.

4. Have someone quiz you.

Enlist a family member or friend to quiz you on each flash card. If you correctly identify or explain a formula, place a check mark in the target on the flash card. Once a formula is completely memorized, remove it from your stack of flash cards.



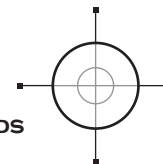
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POWERSCORE ACT Math Bible Flash Cards

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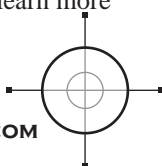
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Order of Operations

P E M D A S

Let's look at an example of an expression in which of the order of operations is required:

$$5(1 + 4)^2 - 10$$

Begin with operation in the parentheses (P):

$$5(1 + 4)^2 - 10 = 5(5)^2 - 10$$

Now remove the exponents (E):

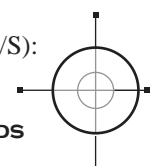
$$5(5)^2 - 10 = 5(25) - 10$$

Multiplication and division are next (M/D):

$$5(25) - 10 = 125 - 10$$

Finally, addition and subtraction are performed (A/S):

$$125 - 10 = 115$$



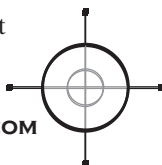
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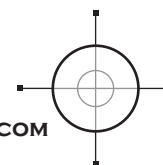
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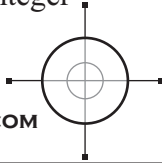
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integer

Any number in the set of positive and negative whole numbers and zero:

$$\{\dots -4, -3, -2, -1, 0, 1, 2, 3, 4\dots\}$$

- Integers do not include fractions or decimals
- Integers are the most commonly used numbers on the ACT
- It is important to remember that 0 is an integer



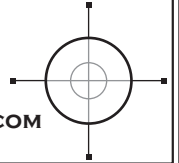
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set

A collection of numbers marked by brackets:

$$\{4, 6, 9, 13\}$$

- Sets can contain any amount of numbers
- Sets may have rules, such as “all even integers”



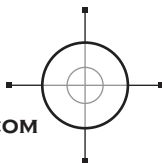
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digit

The numbers 0 through 9:

$$\{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$$

- *Place* is used to represent where in a number a digit occurs
- The ones digit or units digit in 3748 is 8
- The tens digit in 3748 is 4
- The hundreds digit in 3748 is 7

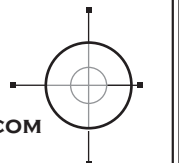


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sum

The amount obtained by adding numbers

- The sum of 2, 3, and 4 is 9: $(2 + 3 + 4 = 9)$
- The sum of x and y is $x + y$

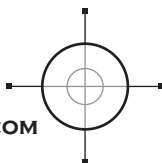


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product

The amount obtained by multiplying numbers

- The product of 2, 3, and 4 is 24: $(2 \times 3 \times 4 = 24)$
- The product of x and y is xy

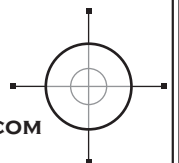


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multiple

An integer that is divisible by another integer without a remainder

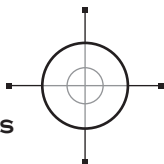
- Multiples of 3 include $\{-6, -3, 3, 6, 9, 12\}$
- Multiples of 4 include $\{-8, -4, 4, 8, 12, 16\}$



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DEFINITION

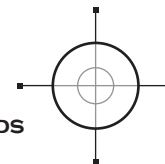
set



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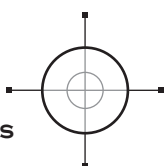
integer



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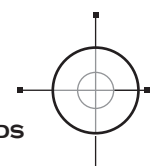
sum



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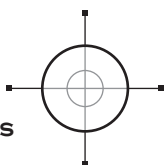
digit



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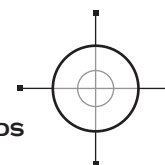
multiple



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product

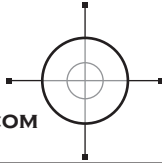


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divisible

Describes a number capable of being divided without a remainder. A number that is divisible by x is also said to be a multiple of x .

- 18 is divisible by 1, 2, 3, 6, 9, and 18
- xy is divisible by 1, x , y , and xy

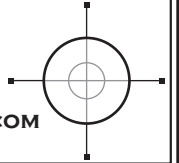


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factor

One of two or more numbers that divides into a larger number without a remainder

- Factors of 18 are 1 and 18, 2 and 9, and 3 and 6
- Factors of xy include 1 and xy , plus x and y



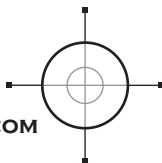
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10 prime numbers

{2, 3, 5, 7, 11, 13, 17, 19, 23, 29, ...}

Additional prime numbers under 100:

{31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97}



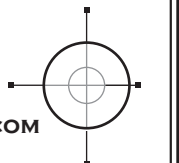
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prime number

An integer that does not have any factors besides itself and 1

{2, 3, 5, 7, 11, 13, 17, 19, 23, 29, ...}

- One (1) is not a prime number
- When prime numbers are multiplied together, the product's factors are limited to itself, one, and the prime numbers themselves

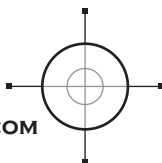


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prime factor

Prime numbers that divide into a larger number without a remainder

- Factors of 18 are 1 and 18, 2 and 9, and 3 and 6; the prime factors are 2 and 3

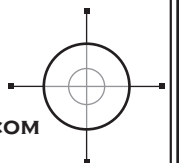


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common factor

A factor shared by two numbers

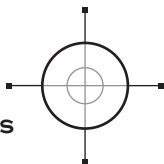
- Factors of 18 are 1 and 18, 2 and 9, and 3 and 6.
- Factors of 15 are 1 and 15 and 3 and 5.
- The common factors of 15 and 18 are 1 and 3.



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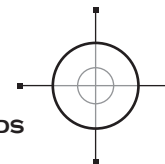
factor



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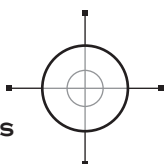
divisible



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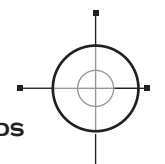
prime number



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ARITHMETIC

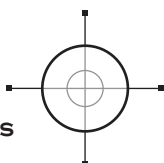
What are the first
10 prime numbers?



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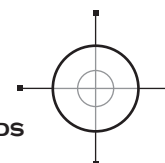
common factor



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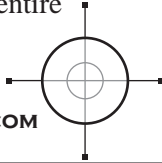
prime factor



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Rules of Divisibility

- 2: If the last digit of a number is even, it is a multiple of 2.
- 3: If the sum of the digits is divisible by 3, the entire integer is a multiple of 3.
- 4: If the last two digits are a multiple of 4, the entire number is a multiple of 4.
- 5: If the last digit ends in 0 or 5, the entire number is divisible by 5.
- 6: If the number is both divisible by 2 and 3, it is divisible by 6.
- 9: If the sum of the digits is divisible by 9, the entire integer is a multiple of 9

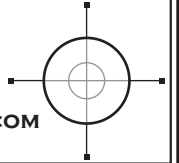


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Addition of Integers

even + even = even
odd + odd = even
odd + even = odd

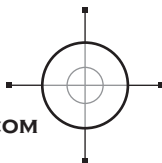
positive + positive = positive
negative + negative = negative
positive + negative = can be either



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Fraction Equivalent

0.125

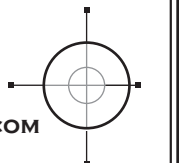


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Multiplication of Integers

even × even = even
odd × odd = odd
odd × even = even

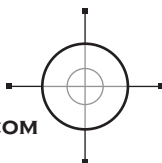
positive × positive = positive
negative × negative = positive
positive × negative = negative



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Fraction Equivalent

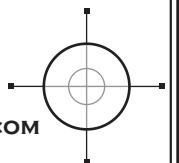
0.16 $\bar{6}$



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Fraction Equivalent

0.2



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ARITHMETIC

Addition of Integers

even + even =

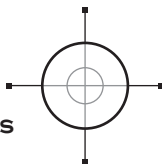
odd + odd =

odd + even =

positive + positive =

negative + negative =

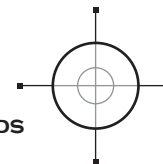
positive + negative =



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SHORTCUT

Rules of Divisibility



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ARITHMETIC

Multiplication of Integers

even + even =

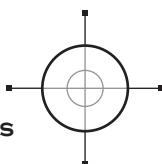
odd + odd =

odd + even =

positive + positive =

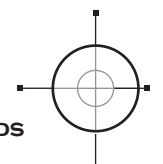
negative + negative =

positive + negative =



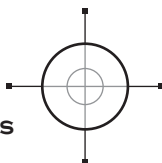
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DECIMAL EQUIVALENT

$$\frac{1}{8}$$


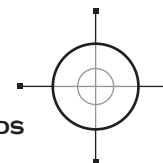
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DECIMAL EQUIVALENT

$$\frac{1}{5}$$


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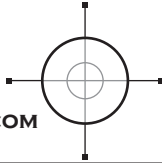
DECIMAL EQUIVALENT

$$\frac{1}{6}$$


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Fraction Equivalent

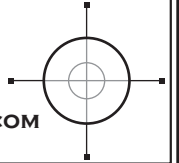
0.25



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Fraction Equivalent

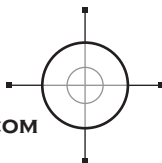
$0.3\bar{3}$



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Fraction Equivalent

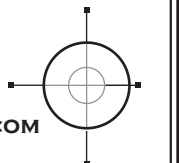
0.5



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Fraction Equivalent

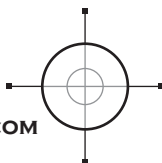
0.4



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Fraction Equivalent

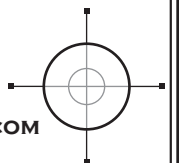
$0.6\bar{6}$



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Fraction Equivalent

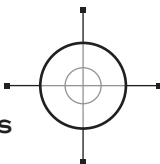
0.75



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DECIMAL EQUIVALENT

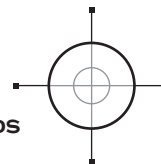
$$\frac{1}{3}$$



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DECIMAL EQUIVALENT

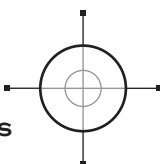
$$\frac{1}{4}$$



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DECIMAL EQUIVALENT

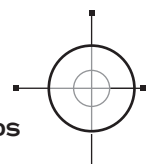
$$\frac{2}{5}$$



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DECIMAL EQUIVALENT

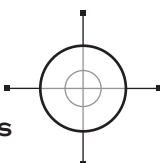
$$\frac{1}{2}$$



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DECIMAL EQUIVALENT

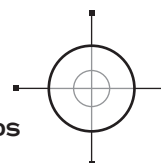
$$\frac{3}{4}$$



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DECIMAL EQUIVALENT

$$\frac{2}{3}$$

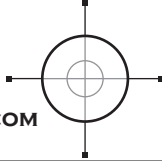


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rate formula

$$r = \frac{d}{t}$$

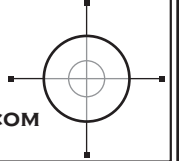
r = rate d = distance t = time



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what percent?

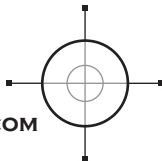
$$\frac{x}{100} \text{ or } \frac{?}{100}$$



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average rate of speed

$$\frac{2 \times \text{rate}_1 \times \text{rate}_2}{\text{rate}_1 + \text{rate}_2}$$

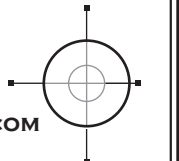


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combined work

$$\frac{1}{t_1} + \frac{1}{t_2} + \frac{1}{t_3} = \frac{1}{t_T}$$

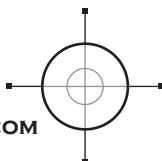
t_1 = time of first person
 t_2 = time of second person
 t_3 = time of third person
 t_T = time together



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plus, more than, added to,
increased by, sum

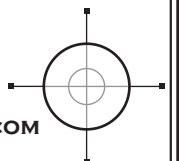
+



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what? what number?

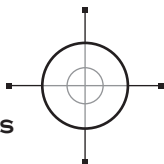
x, n, ?, or
other variable



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TRANSLATE

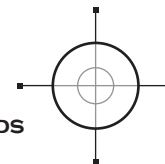
How do you represent the phrase “what percent”?



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WORK AND RATES

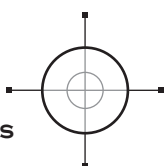
What is the rate formula?



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WORK AND RATES

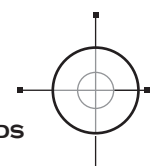
What is the formula for combined work problems?



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WORK AND RATES

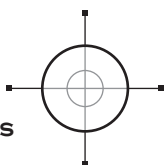
What is the formula for average rate of speed?



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TRANSLATE

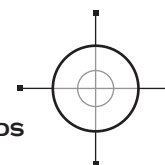
How do you represent “what” or “what number?”



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TRANSLATE

How do you represent “plus,” “more than,” “added to,” “increased by,” and “sum?”

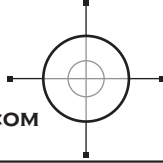


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minus, less than, subtracted from,
decreased by, reduced by, difference

—

(minus sign)

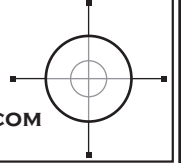


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of, times, product

×

(multiplication sign)

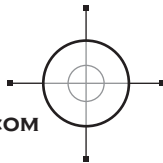


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per, out of, quotient

÷

(division sign)

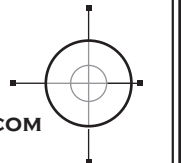


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is, equals, result

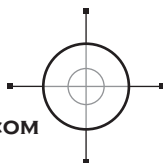
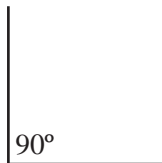
=

(equals sign)



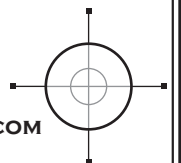
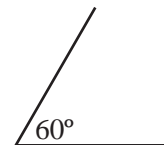
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90° angle



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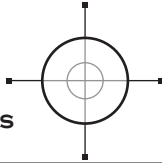
60° angle



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TRANSLATE

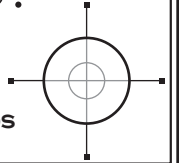
How do you represent “of,”
“times,” or “product?”



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TRANSLATE

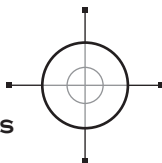
How do you represent
“minus,” “less than,”
“subtracted from,”
“decreased by,” “reduced
by,” and “difference?”



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TRANSLATE

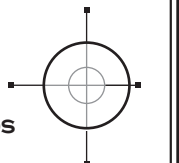
How do you represent “is,”
“equals,” or “result?”



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TRANSLATE

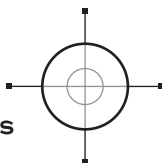
How do you represent “per,”
“out of,” or “quotient?”



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BENCHMARKS

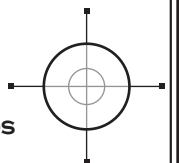
Illustrate a 60° angle.



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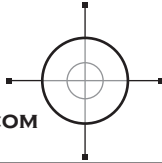
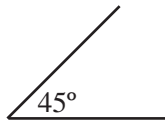
BENCHMARKS

Illustrate a 90° angle.



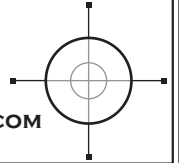
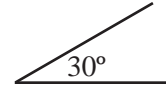
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45° angle



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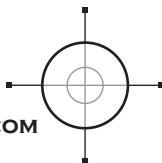
30° angle



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divide by same base

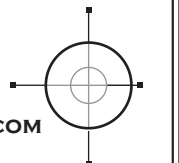
$$x^n \div x^m = x^{n-m}$$



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multiply by same base

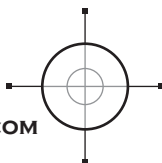
$$(x^n)(x^m) = x^{n+m}$$



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multiply by same power

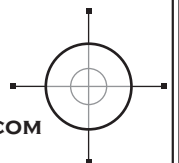
$$(x^n)(y^n) = (xy)^n$$



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divide by same power

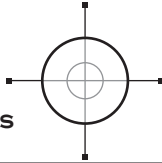
$$x^n \div y^n = (x \div y)^n$$



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BENCHMARKS

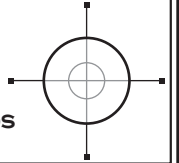
Illustrate a 30° angle.



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BENCHMARKS

Illustrate a 45° angle.

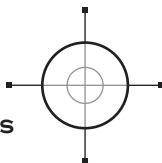


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EXPONENTS AND ROOTS

Multiplication of
the same base:

$$(x^n)(x^m)$$

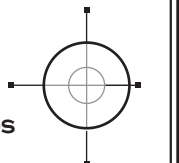


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EXPONENTS AND ROOTS

Division of
the same base:

$$x^n \div x^m$$

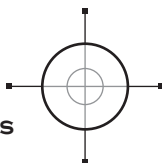


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EXPONENTS AND ROOTS

Division with
the same power:

$$x^n \div y^n$$

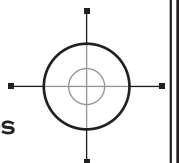


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EXPONENTS AND ROOTS

Multiplication with
the same power:

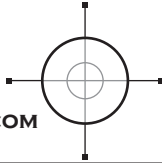
$$(x^n)(y^n)$$



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base^{-negative}

$$\frac{1}{x^n}$$

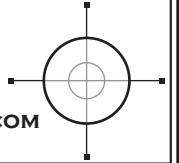


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base⁰

$$1$$

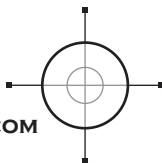
$$3^0 = 1 \text{ and } x^0 = 1$$



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single base with powers

$$(x^n)^m = x^{n \times m}$$

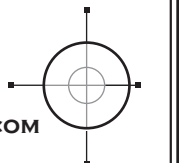


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fractional exponents

$$x^{\frac{n}{m}} = \sqrt[m]{x^n}$$

$$x^{\frac{\text{power}}{\text{root}}} = \sqrt[\text{root}]{x^{\text{power}}}$$



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classic form #2

$$(x + y)^2 = x^2 + 2xy + y^2$$

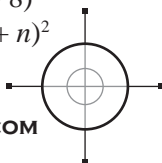
Examples:

$$(t + 5)^2 \rightarrow t^2 + 2(t)(5) + 5^2 \rightarrow t^2 + 10t + 25$$

$$(3a + b)(3a + b) \rightarrow 9a^2 + 6ab + b^2$$

$$y^2 + 16y + 64 \rightarrow y^2 + 2(y)(8) + 8^2 \rightarrow (y + 8)^2$$

$$36 + 12n + n^2 \rightarrow 6^2 + 2(n)(6) + n^2 \rightarrow (6 + n)^2$$



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classic form #1

$$(x + y)(x - y) = x^2 - y^2$$

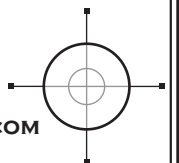
Examples:

$$(t - 5)(t + 5) \rightarrow t^2 - 5^2 \rightarrow t^2 - 25$$

$$(3a + b)(3a - b) \rightarrow (3a)^2 - b^2 \rightarrow 9a^2 - b^2$$

$$y^2 - 64 \rightarrow y^2 - 8^2 \rightarrow (y + 8)(y - 8)$$

$$36 - n^2 \rightarrow 6^2 - n^2 \rightarrow (6 + n)(6 - n)$$

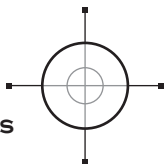


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EXPONENTS AND ROOTS

When a base is raised to the power of 0, what is the result?

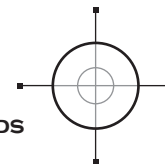
For example, what is 3^0 or x^0 ?



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EXPONENTS AND ROOTS

$$x^{-n}$$

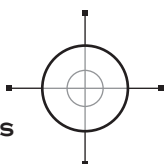


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EXPONENTS AND ROOTS

Fractional exponents:

$$x^{\frac{n}{m}}$$

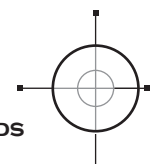


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EXPONENTS AND ROOTS

Multiplication of a single base with multiple powers:

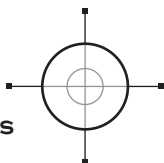
$$(x^n)^m$$



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CLASSIC QUADRATIC FORM

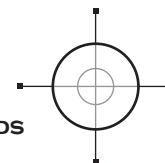
$$(x + y)(x - y) =$$



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CLASSIC QUADRATIC FORM

$$(x + y)^2 =$$



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classic form #3

$$(x - y)^2 = x^2 - 2xy + y^2$$

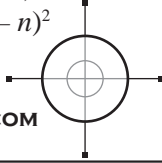
Examples:

$$(t - 5)^2 \rightarrow t^2 - 2(t)(5) + 5^2 \rightarrow t^2 - 10t + 25$$

$$(3a - b)(3a - b) \rightarrow 9a^2 - 6ab + b^2$$

$$y^2 - 16y + 64 \rightarrow y^2 - 2(y)(8) + 8^2 \rightarrow (y - 8)^2$$

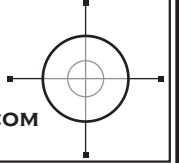
$$36 - 12n + n^2 \rightarrow 6^2 - 2(n)(6) + n^2 \rightarrow (6 - n)^2$$



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direct variation

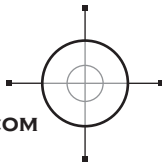
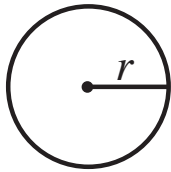
$$y = cx$$



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area of a circle

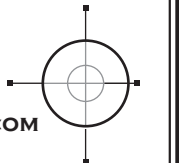
$$A = \pi r^2$$



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indirect variation

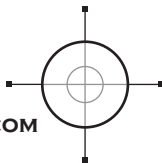
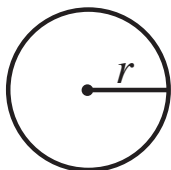
$$c = xy$$



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circumference of a circle

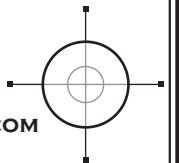
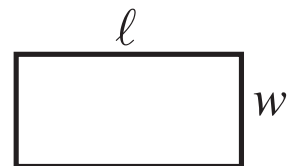
$$C = 2\pi r$$



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area of a rectangle

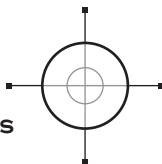
$$A = lw$$



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DIRECT VARIATION

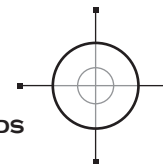
What is the formula for direct variation?



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CLASSIC QUADRATIC FORM

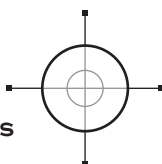
$$(x - y)^2 =$$



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INDIRECT VARIATION

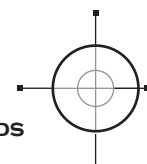
What is the formula for indirect variation?



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CIRCLES

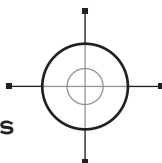
What is the formula for the area of a circle?



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QUADRILATERALS

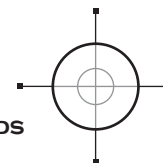
What is the formula for the area of a rectangle?



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CIRCLES

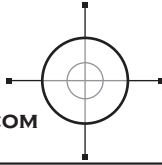
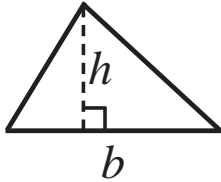
What is the formula for the circumference of a circle?



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area of a triangle

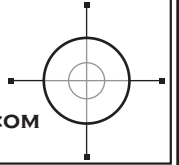
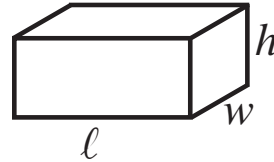
$$A = \frac{1}{2}bh$$



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volume of a rectangular solid

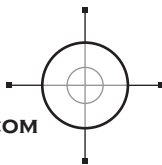
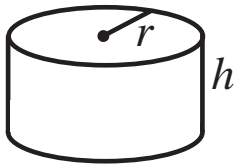
$$V = \ell wh$$



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volume of a cylinder

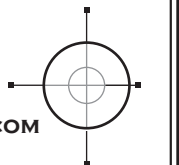
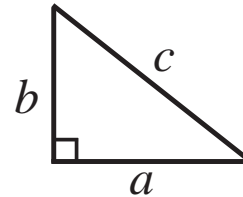
$$V = \pi r^2 h$$



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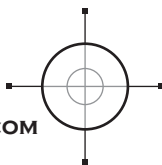
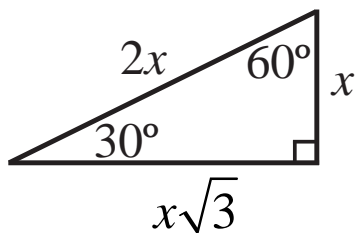
Pythagorean Theorem

$$a^2 + b^2 = c^2$$



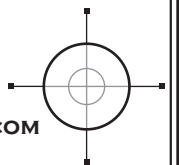
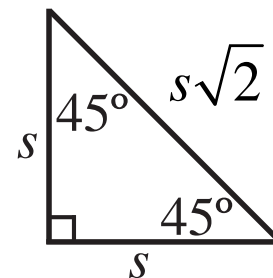
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30°:60°:90° triangle



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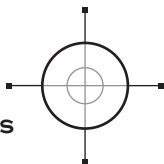
45°:45°:90° triangle



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SOLIDS

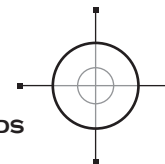
What is the formula for the volume of a rectangular solid?



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TRIANGLES

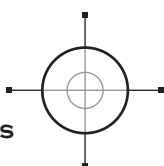
What is the formula for the area of a triangle?



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TRIANGLES

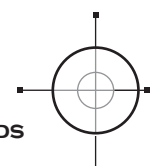
What is the Pythagorean Theorem?



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SOLIDS

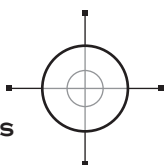
What is the formula for the volume of a right circular cylinder?



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TRIANGLES

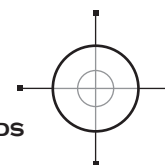
What are the assigned side ratios in a $45^\circ:45^\circ:90^\circ$ triangle?



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TRIANGLES

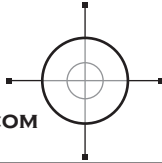
What are the assigned side ratios in a $30^\circ:60^\circ:90^\circ$ triangle?



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degrees of arc in a circle

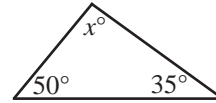
360°



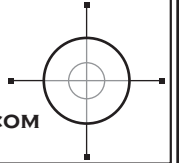
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sum of the angles in a triangle

180°

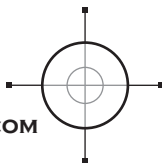
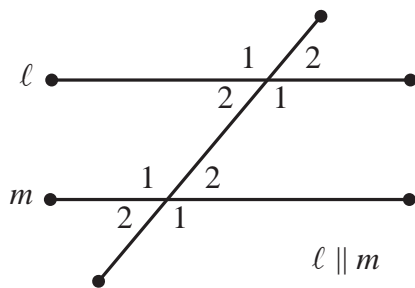


$$x^\circ + 50^\circ + 35^\circ = 180^\circ \quad x = 95^\circ$$



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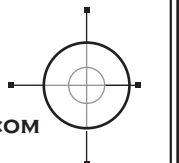
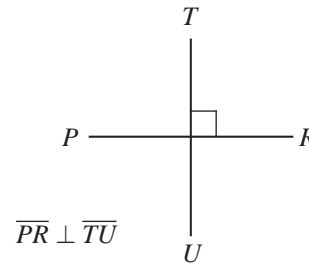
intersected parallel lines



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perpendicular lines

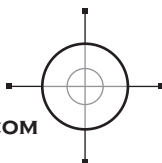
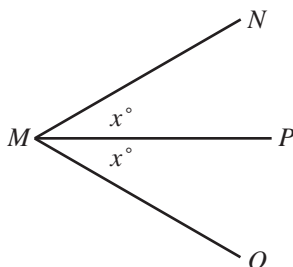
right angle



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bisect

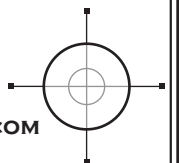
bisect = to divide in two equal parts



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perimeter of a triangle

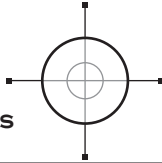
$$\text{perimeter} = s_1 + s_2 + s_3$$



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TRIANGLES

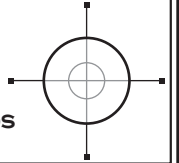
What is the sum of of the measures in degrees of the angles of a triangle?



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CIRCLES

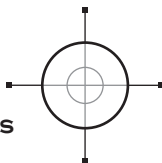
How many degrees of arc are in a circle?



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LINES AND ANGLES

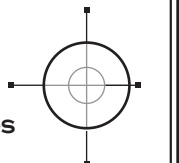
What angle is created by the intersection of perpendicular lines?



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LINES AND ANGLES

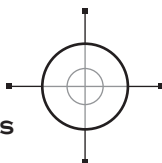
What relationship results when two or more parallel lines are intersected by a transversal?



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BASIC TRIANGLES

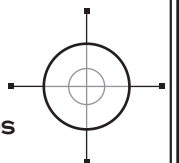
What is the formula for finding the perimeter of a triangle?



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LINES AND ANGLES

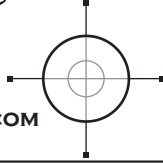
What is the definition of "bisect"?



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sum of the lengths of 2 sides

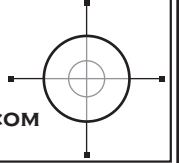
The sum of the lengths of any two sides of a triangle is always greater than the length of the remaining side.



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sum of the angles in a triangle

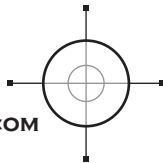
180°



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Pythagorean Triples

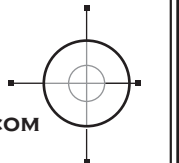
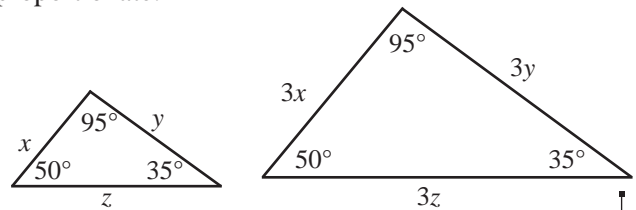
- 3 : 4 : 5
- 5 : 12 : 13
- 7 : 24 : 25
- 8 : 15 : 17
- 9 : 40 : 41
- 12 : 35 : 37
- 20 : 21 : 29



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similar triangles

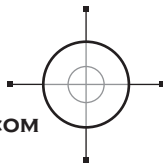
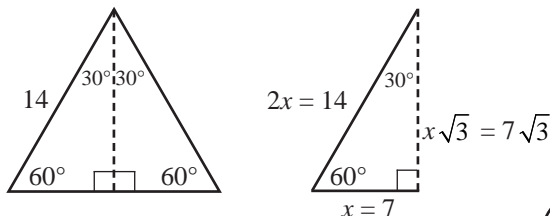
Triangles that have the exact same shape but different area. The corresponding angle measurements of similar triangles are equal, and the corresponding side lengths are proportionate:



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hidden triangles

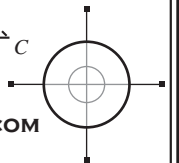
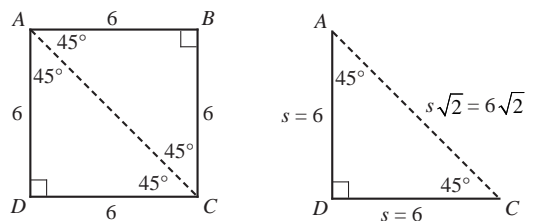
Two 30°:60°:90° triangles are hidden in every equilateral triangle:



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hidden triangles

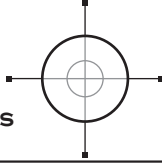
Two 45°:45°:90° triangles are hidden in every square:



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BASIC TRIANGLES

What is the sum of of the measures in degrees of the angles of a triangle?

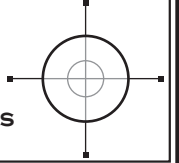


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BASIC TRIANGLES

The sum of the lengths of any two sides of a triangle is always greater than

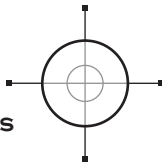
_____.



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BASIC TRIANGLES

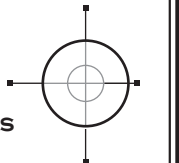
What are similar triangles?



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SPECIAL TRIANGLES

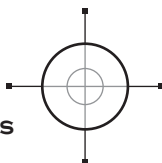
Name the most common Pythagorean Triples.



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SPECIAL TRIANGLES

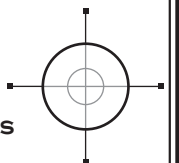
What is hidden in a square?



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SPECIAL TRIANGLES

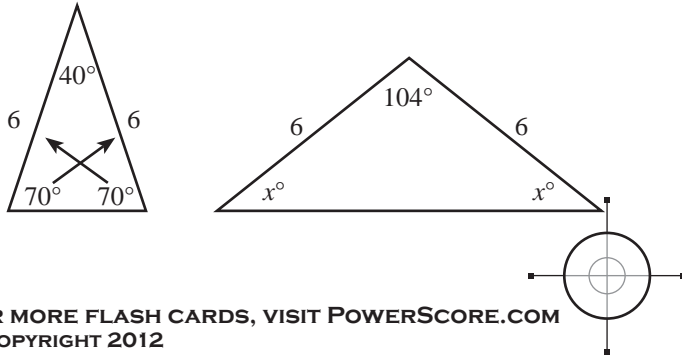
What is hidden in an equilateral triangle?



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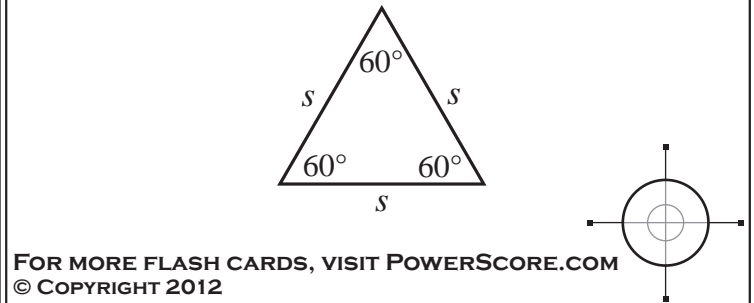
isosceles triangles

An isosceles triangle has two sides of equal length and two angles of equal size. The two equal angles are opposite the two equal-length sides:



equilateral triangles

Equilateral triangles have equal side lengths and equal angle measurements. Since the interior angles of a triangle add up to 180° , the three angles of an equilateral triangle must each equal 60° :



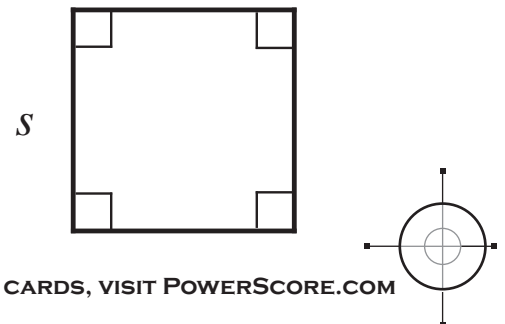
perimeter of a rectangle

$$P = 2\ell + 2w$$



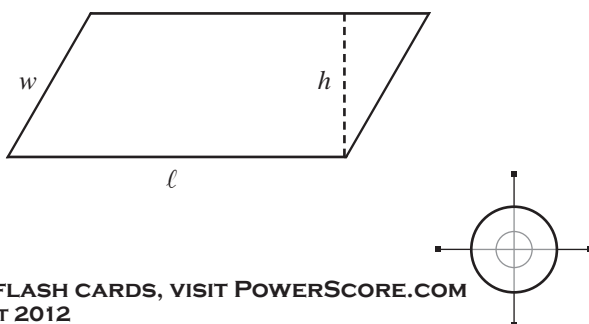
area of a square

$$A = \ell w \text{ or } s^2$$



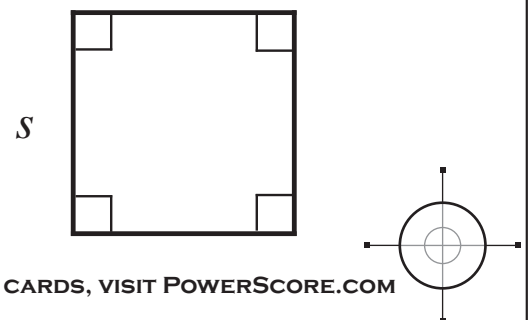
area of a parallelogram

$$A = \ell h$$



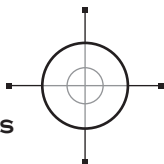
perimeter of a square

$$P = 4s$$



SPECIAL TRIANGLES

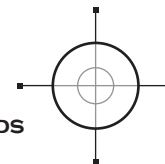
What is an equilateral triangle?



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BASIC TRIANGLES

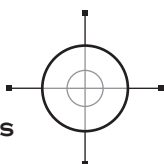
What is an isosceles triangle?



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QUADRILATERALS

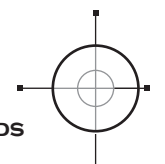
What is the formula for the area of a square?



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QUADRILATERALS

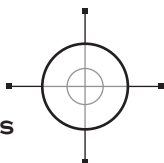
What is the formula for the perimeter of a rectangle?



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QUADRILATERALS

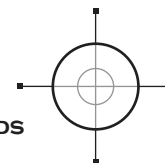
What is the formula for the perimeter of a square?



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QUADRILATERALS

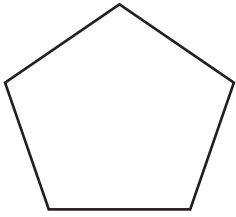
What is the formula for the area of a parallelogram?



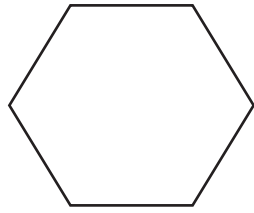
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regular polygons

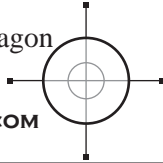
Polygons that have equal side lengths and equal angle measurements are called regular polygons.



Regular Pentagon



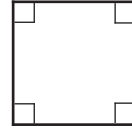
Regular Hexagon



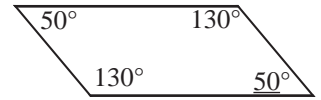
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interior angles of a quadrilateral

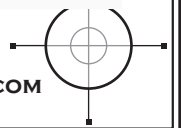
360°



$$90^\circ + 90^\circ + 90^\circ + 90^\circ = 360^\circ$$



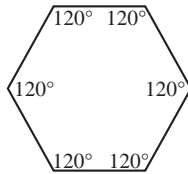
$$50^\circ + 130^\circ + 50^\circ + 130^\circ = 360^\circ$$



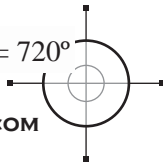
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interior angles of a hexagon

720°



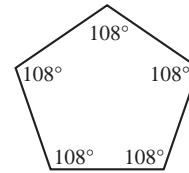
$$120^\circ + 120^\circ + 120^\circ + 120^\circ + 120^\circ + 120^\circ = 720^\circ$$



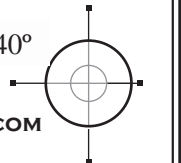
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interior angles of a pentagon

540°



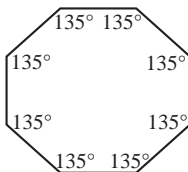
$$108^\circ + 108^\circ + 108^\circ + 108^\circ + 108^\circ = 540^\circ$$



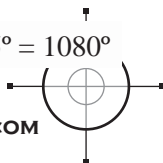
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interior angles of a octagon

1080°



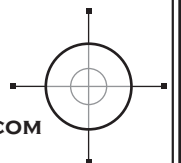
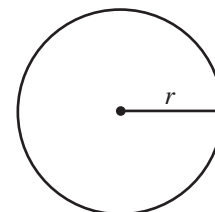
$$135^\circ + 135^\circ + 135^\circ + 135^\circ + 135^\circ + 135^\circ + 135^\circ + 135^\circ = 1080^\circ$$



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circumference of a circle

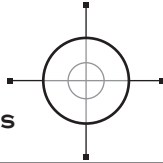
$$C = 2\pi r$$



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POLYGONS

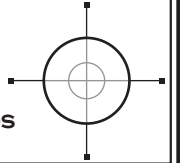
What is the sum of the interior angles of a quadrilateral?



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POLYGONS

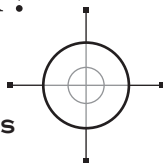
What is a regular polygon?



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POLYGONS

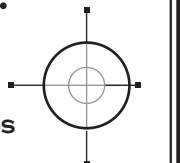
What is the sum of the interior angles of a pentagon? What is the measure of each angle in a regular pentagon?



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POLYGONS

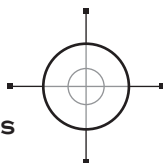
What is the sum of the interior angles of a hexagon? What is the measure of each angle in a regular hexagon?



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CIRCLES

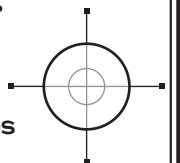
What is the formula for the circumference of a circle?



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POLYGONS

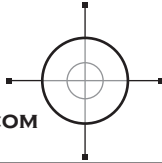
What is the sum of the interior angles of an octagon? What is the measure of each angle in a regular octagon?



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tangent

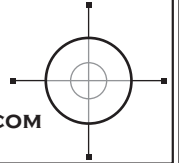
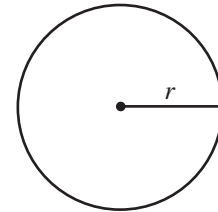
A tangent is a line that touches a circle at only one point. A radius or diameter drawn to that point is perpendicular to the tangent.



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area of a circle

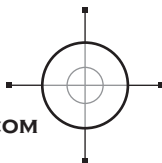
$$A = \pi r^2$$



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length of an arc

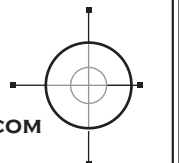
$$\text{The length of an arc} = \frac{x^\circ}{360^\circ} (2\pi r)$$



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area of a sector

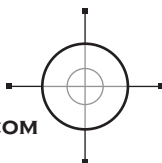
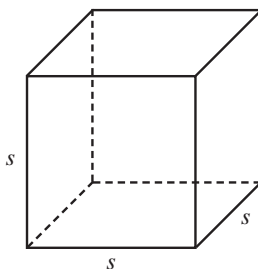
$$\text{The area of a sector} = \frac{x^\circ}{360^\circ} (\pi r^2)$$



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volume of a cube

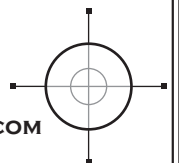
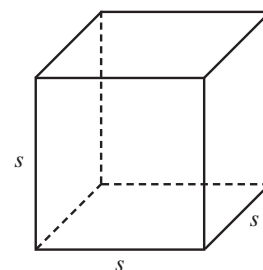
$$V = s^3$$



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surface area of a cube

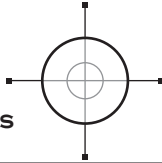
$$SA = 6s^2$$



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CIRCLES

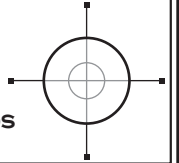
What is the formula for the area of a circle?



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CIRCLES

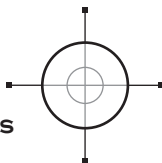
What is a tangent?



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CIRCLES

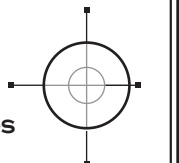
What is the formula for finding the area of a sector?



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CIRCLES

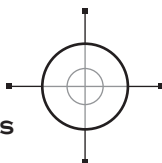
What is the formula for finding the length of an arc?



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GEOMETRIC SOLIDS

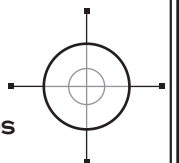
What is the formula for the surface area of a cube?



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GEOMETRIC SOLIDS

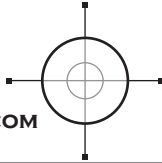
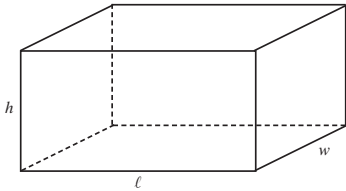
What is the formula for the volume of a cube?



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volume of a rectangular solid

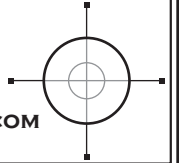
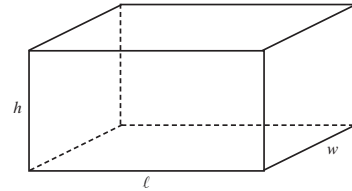
$$V = \ell wh$$



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surface area
of a rectangular solid

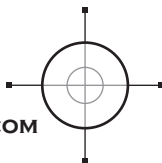
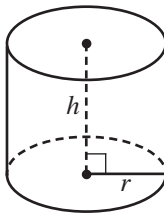
$$SA = 2\ell w + 2\ell h + 2wh$$



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volume of a cylinder

$$V = \pi r^2 h$$

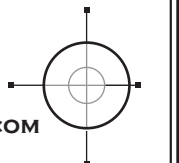


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length of a diagonal
in a rectangular solid

Length of the diagonal =

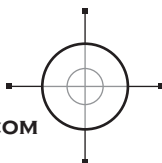
$$\sqrt{l^2 + w^2 + h^2}$$



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distance formula

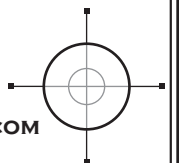
$$\text{Distance} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$



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midpoint formula

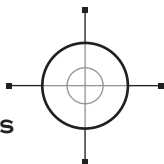
$$\text{Midpoint} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$



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GEOMETRIC SOLIDS

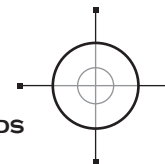
What is the formula for the surface area of a rectangular solid?



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GEOMETRIC SOLIDS

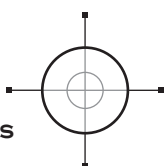
What is the formula for the volume of a rectangular solid?



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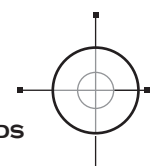
What is the formula for the length of a diagonal in a rectangular solid?



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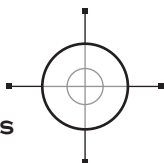
What is the formula for the volume of a right circular cylinder?



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COORDINATE GEOMETRY

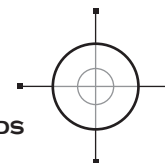
What is the Midpoint Formula?



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COORDINATE GEOMETRY

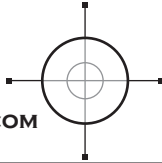
What is the Distance Formula?



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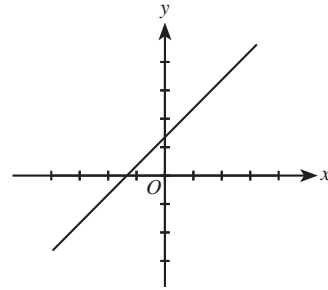
slope formula

$$\text{Slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

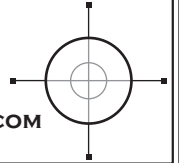


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up

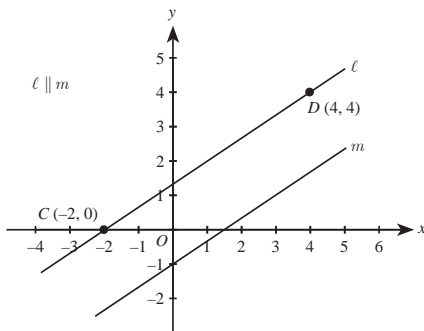


Positive Slope



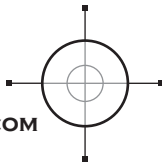
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parallel lines have equal slopes



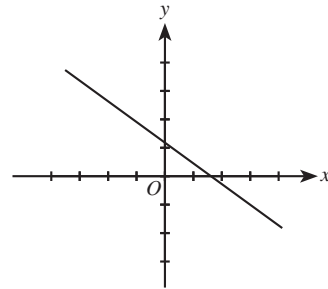
Slope of line $\ell = \frac{2}{3}$

Slope of line $m = \frac{2}{3}$

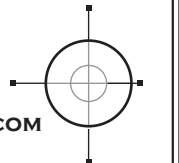


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down

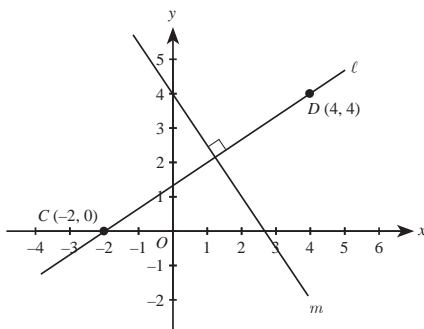


Negative Slope



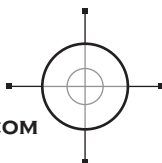
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perpendicular lines have slopes that are negative reciprocals



Slope of line $\ell = \frac{2}{3}$

Slope of line $m = \frac{2}{3}$



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equation of a line

Equation of a line: $y = mx + b$

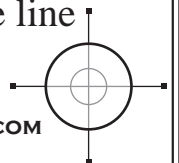
Where:

m = slope

b = y-intercept

x and y = the x - and y -coordinate

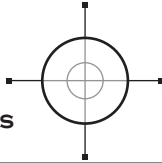
(x, y) of any point on the line



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COORDINATE GEOMETRY

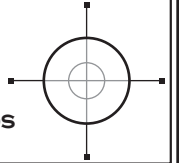
Lines with a positive slope
tilt _____ when moving
from left to right.



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COORDINATE GEOMETRY

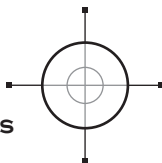
What is the
Slope Formula?



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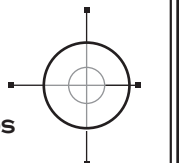
Lines with a negative slope
tilt _____ when moving
from left to right.



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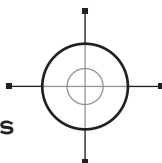
How are the slopes of
parallel lines related?



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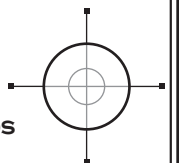
What is the
equation of a line?



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How are the slopes
of perpendicular
lines related?



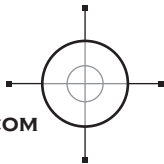
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standard equation of a parabola

Standard equation of a parabola: $y = ax^2 + bx + c$

- a , b , and c are constants
- x and y = the x - and y -coordinate (x, y) of any point on the parabola
- $(0, c)$ is the y -intercept

- When a is positive, the parabola opens upward
- When a is negative, the parabola opens downward
- When $b = 0$, the parabola is centered on the y -axis
- When $b > 0$, the parabola moves to the left of the y -axis
- When $b < 0$, the parabola moves to the right of the y -axis



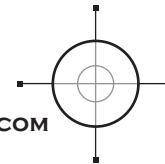
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vertex equation of a parabola

Vertex equation of a parabola: $y = a(x - h)^2 + k$

- (h, k) is the vertex of the parabola
- x and y = the x - and y -coordinate (x, y) of any point on the parabola

- When a is positive, the parabola opens upward
- When a is negative, the parabola opens downward



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equation of a linear function

Equation of a line: $y = mx + b$

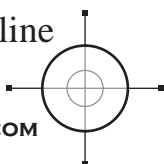
Equation of a linear function: $f(x) = mx + b$

Where:

m = slope

b = y -intercept

x and $f(x)$ = the x - and y -coordinate (x, y) of any point on the line



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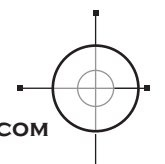
standard equation of a quadratic function

Standard equation of a parabola:

$$y = ax^2 + bx + c$$

Standard equation of a quadratic function:

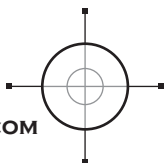
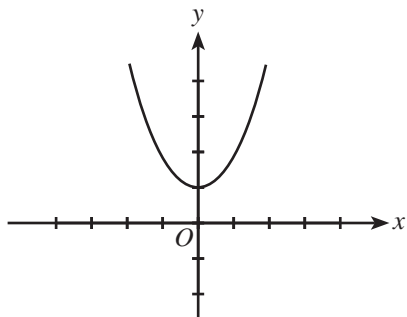
$$f(x) = ax^2 + bx + c$$



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$$y = f(x) + 1$$

Shifts up 1 unit



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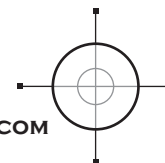
vertex equation of a quadratic function

Vertex equation of a parabola:

$$y = a(x - h)^2 + k$$

Vertex equation of a quadratic function:

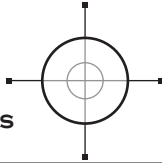
$$f(x) = a(x - h)^2 + k$$



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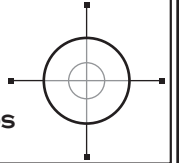
Lines with a positive slope
tilt _____ when moving
from left to right.



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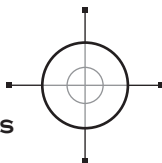
What is the standard
equation of a parabola?



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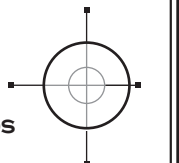
What is the standard
equation of a
quadratic function?



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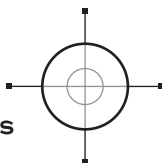
What is the equation of a
linear function?



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What is the vertex
equation of a
quadratic function?

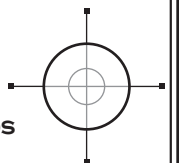


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COORDINATE GEOMETRY

Translation:

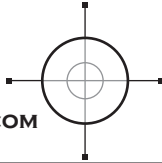
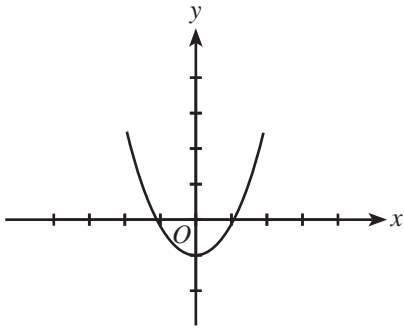
$$y = f(x) + 1$$



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$$y = f(x) - 1$$

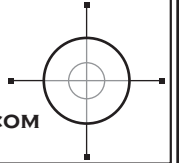
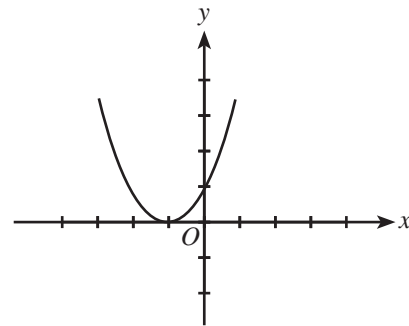
Shifts down 1 unit



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$$y = f(x + 1)$$

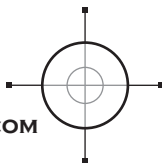
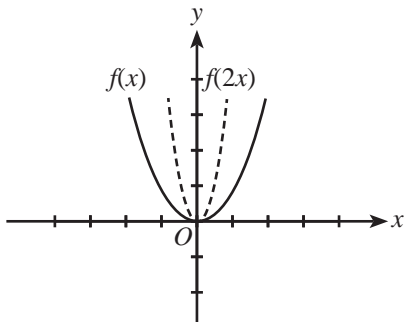
Shifts left 1 unit



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$$y = f(2x)$$

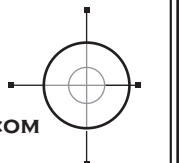
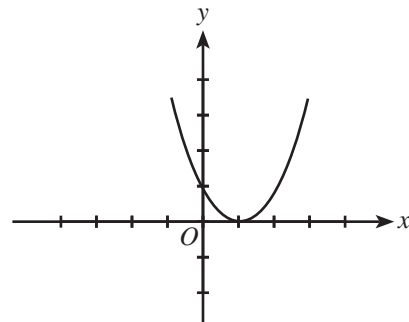
The parabola becomes "skinnier"



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$$y = f(x - 1)$$

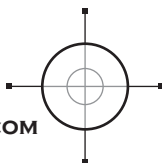
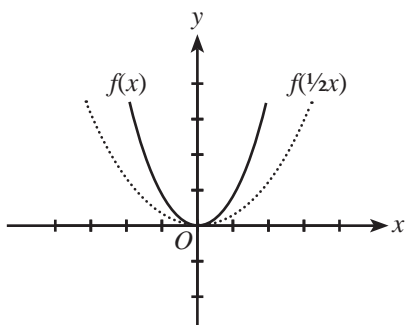
Shifts right 1 unit



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$$y = f(\frac{1}{2}x)$$

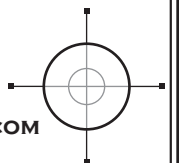
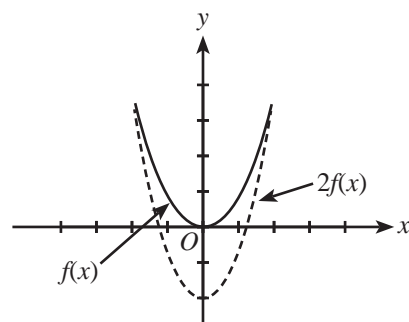
The parabola becomes "fatter"



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$$y = 2f(x)$$

The parabola becomes "longer"

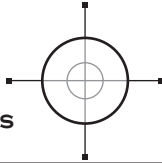


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COORDINATE GEOMETRY

Translation:

$$y = f(x + 1)$$

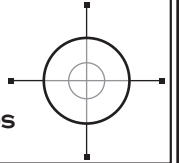


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COORDINATE GEOMETRY

Translation:

$$y = f(x) - 1$$

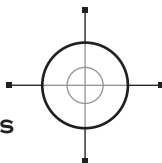


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COORDINATE GEOMETRY

Translation:

$$y = f(x - 1)$$

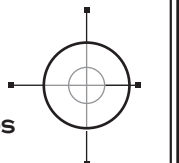


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COORDINATE GEOMETRY

Transformation:

$$y = f(2x)$$

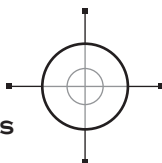


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COORDINATE GEOMETRY

Transformation:

$$y = 2f(x)$$

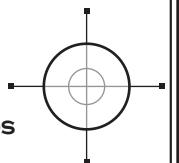


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Transformation:

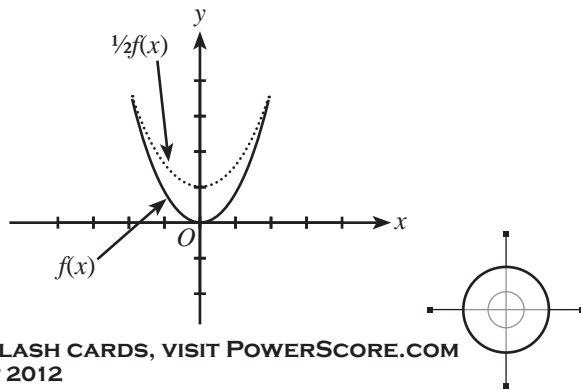
$$y = f\left(\frac{1}{2}x\right)$$



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$$y = \frac{1}{2}f(x)$$

The parabola becomes "shorter"

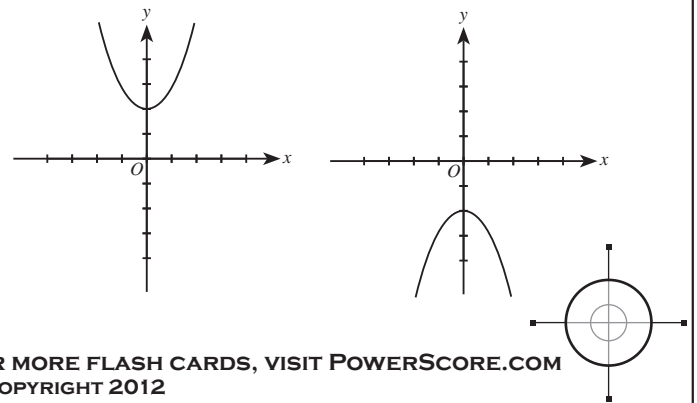


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reflection over the x-axis

$$y = f(x)$$

$$y = -f(x)$$

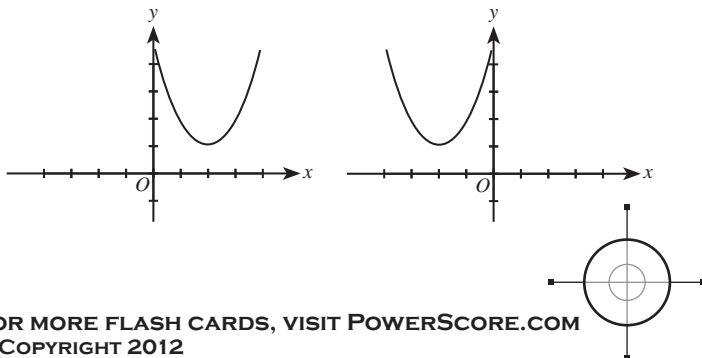


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reflection over the y-axis

$$y = f(x)$$

$$y = f(-x)$$



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average (arithmetic mean)

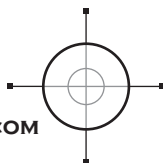
$$\frac{\text{sum of the numbers}}{\text{number of numbers}} = \text{average}$$

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median

The median is the number that appears in the middle of a set of ascending numbers.

In the following set,
the median is 5:
{2, 4, 5, 7, 7}

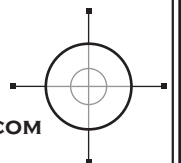


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mode

The mode is the number that appears most frequently in a set.

In the following set, the mode is 7:
{2, 4, 5, 7, 7}

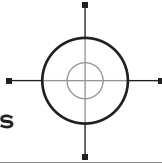


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COORDINATE GEOMETRY

Reflection:

$$y = -f(x)$$

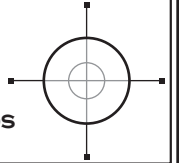


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Transformation:

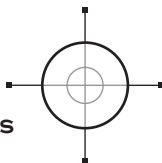
$$y = \frac{1}{2} f(x)$$



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STATISTICS

What is the formula for
finding the average of
a set of numbers?

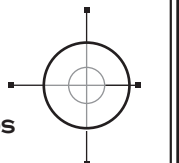


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COORDINATE GEOMETRY

Reflection:

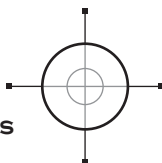
$$y = f(-x)$$



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STATISTICS

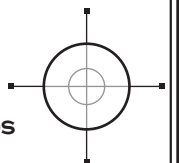
What is the mode?



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STATISTICS

What is the median?

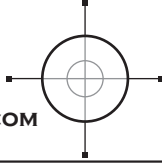


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probability formula

Probability =

$$\frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$$

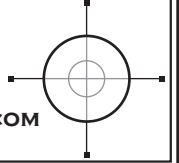


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probability of a non-occurrence

Probability of event not occurring =

$$1 - \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$$



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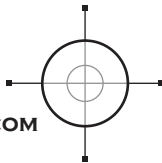
geometric sequence

In a geometric sequence, each term increases by a constant ratio.

$$a_n = a_1 \times r^{n-1}$$

Where:

- a_1 = the first term
- n = the number of terms
- r = constant ratio



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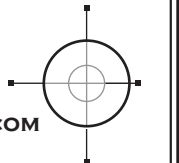
arithmetic sequence

In an arithmetic sequence, each term increases by a constant difference.

$$a_n = a_1 + (n - 1)d$$

Where:

- a_1 = the first term
- n = the number of terms
- d = constant difference

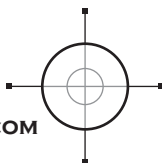


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geometric sequence sum

Sum of the first n terms in a geometric sequence =

$$\frac{a_1(1 - r^n)}{1 - r}$$

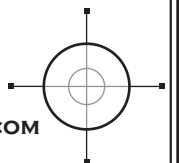


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arithmetic sequence sum

Sum of the first n terms in an arithmetic sequence =

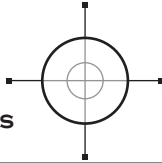
$$n \frac{a_1 + a_n}{2}$$



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PROBABILITY

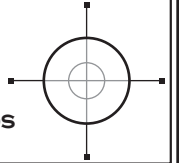
What is the formula for the probability of something not happening?



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PROBABILITY

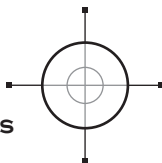
What is the formula for probability?



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SEQUENCES

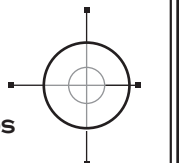
What is an arithmetic sequence and how do you find the n th term?



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SEQUENCES

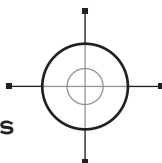
What is a geometric sequence and how do you find the n th term?



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SEQUENCES

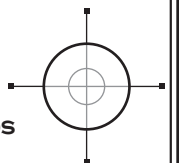
How do you find the sum of the first n terms in an arithmetic sequence?



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SEQUENCES

How do you find the sum of the first n terms in a geometric sequence?

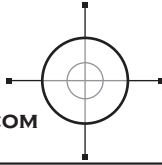


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geometric probability

Geometric Probability =

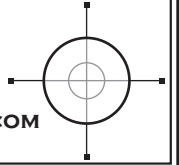
$$\frac{\text{shaded area}}{\text{total possible area}}$$



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overlapping groups

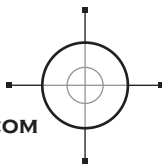
$$\begin{aligned} &\text{Group A} \\ &+ \text{Group B} \\ &+ \text{Neither Group} \\ &- \text{Both Groups} \\ &\text{Total} \end{aligned}$$



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probability of two events

Find the probability of each independent event and then find their product.

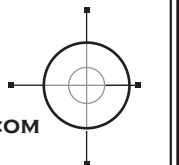


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combinations

Multiply the elements together:

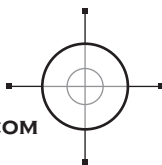
$$2 \text{ shirts} \times 3 \text{ pants} \times 2 \text{ shoes} = 12 \text{ outfit combinations}$$



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visualization

I will be successful because
I am good at ACT math.

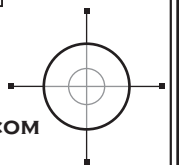


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permutations

Determine the number of elements for each position and then multiply the elements together:

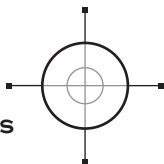
$$\begin{array}{ccccccc} \text{First Place} & & \text{Second Place} & & \text{Third Place} & & \text{Fourth Place} \\ \boxed{4} & \times & \boxed{3} & \times & \boxed{2} & \times & \boxed{1} & = 24 \\ \text{A, B, C, D} & & \text{B, C, D} & & \text{C, D} & & \text{D} & \end{array}$$



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OVERLAPPING GROUPS

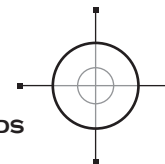
What is the formula for finding a population in an overlapping groups question?



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PROBABILITY

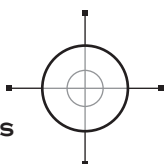
What is the formula for geometric probability?



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COUNTING PROBLEMS

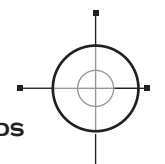
In a combination, how do you find the total number of arrangements?



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PROBABILITY

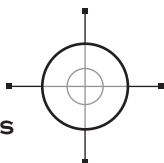
How do you find the probability of two independent events both occurring?



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COUNTING PROBLEMS

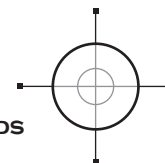
In a permutation, how do you find the total number of arrangements?



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VISUALIZATION

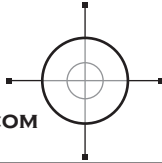
How will I do on the math section of the ACT?



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quadratic formula

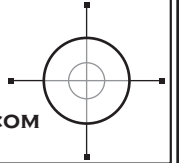
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$



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subset combinations

$$\frac{x!}{y!(x-y)!}$$

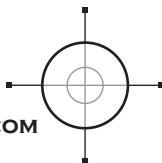


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logarithms and exponents

$$\log_a b = c$$

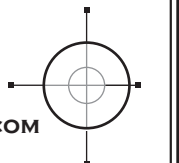
where $a^c = b$



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Power Property

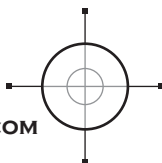
$$\log_a M^x = x \log_a M$$



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Product Property

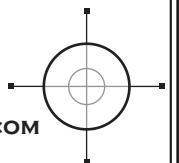
$$\log_a MN = \log_a M + \log_a N$$



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Quotient Property

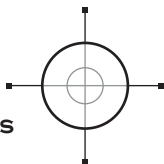
$$\log_a (M/N) = \log_a M - \log_a N$$



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COMBINATIONS

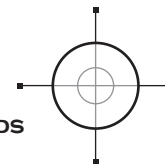
What is the formula
for the number of
subset combinations?



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QUADRATIC FORMULA

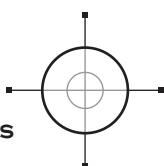
What is the
quadratic formula?



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LOGARITHMS

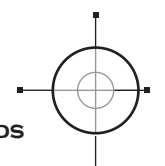
What is the Power
Property of Logarithms?



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LOGARITHMS

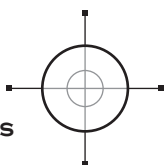
What is the relationship
between logarithms
and exponents?



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LOGARITHMS

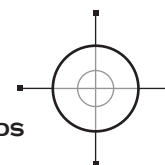
What is the Quotient
Property of Logarithms?



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LOGARITHMS

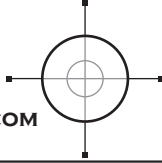
What is the Product
Property of Logarithms?



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rhombus

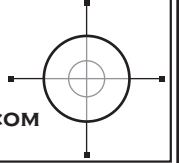
1. Each side is equal length.
2. Two pairs of parallel sides.
3. Opposite angles are equal.
4. Diagonals bisect each other.
5. Diagonals are perpendicular.



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area of a trapezoid

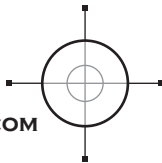
$$\frac{1}{2}(\text{base 1} + \text{base 2}) \times (\text{height})$$



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volume of a cylinder

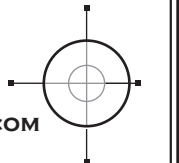
$$\frac{4}{3} \pi r^3$$



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surface area of cylinder

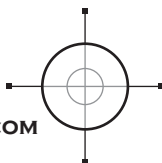
$$2(\pi r^2) + (2\pi rh)$$



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volume of a pyramid

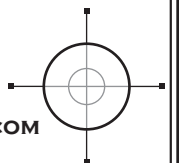
$$\frac{1}{3}(\text{area of base}) \times (\text{height})$$



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volume of a cone

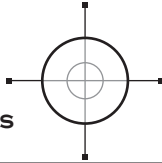
$$\frac{1}{3} \pi r^2 h$$



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TRAPEZOID

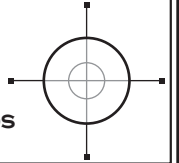
What is the formula for the area of a trapezoid?



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RHOMBUS

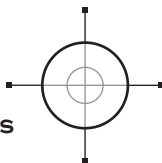
What do you know about a rhombus?



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CYLINDERS

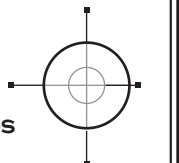
What is the formula for the surface area of a cylinder?



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SPHERE

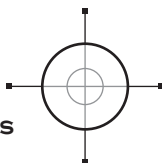
What is the formula for the volume of a sphere?



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CONE

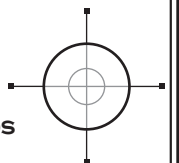
What is the formula for the volume of a cone?



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PYRAMID

What is the formula for the volume of a pyramid?

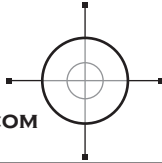


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sine of angle θ

$$\frac{\text{length of side Opposite } \theta}{\text{length of Hypotenuse}}$$

SOH-CAH-TOA

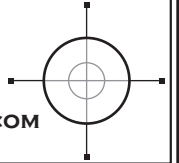


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cosine of angle θ

$$\frac{\text{length of side Adjacent to } \theta}{\text{length of Hypotenuse}}$$

SOH-CAH-TOA

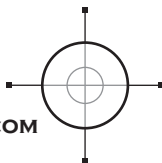


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tangent of angle θ

$$\frac{\text{length of side Opposite } \theta}{\text{length of side Adjacent to } \theta}$$

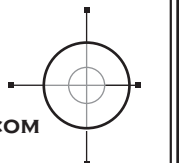
SOH-CAH-TOA



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cosecant (csc)

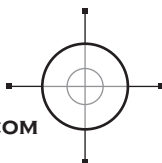
$$\frac{1}{\sin} = \sin^{-1}$$



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cotangent (cot)

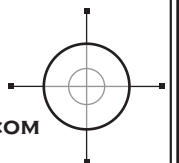
$$\frac{1}{\tan} = \tan^{-1}$$



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secant (sec)

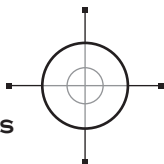
$$\frac{1}{\cos} = \cos^{-1}$$



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TRIGONOMETRY

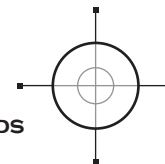
What is the formula for cosine?



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TRIGONOMETRY

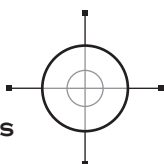
What is the formula for sine?



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TRIGONOMETRY

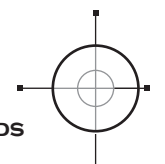
What is the formula for the cosecant?



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TRIGONOMETRY

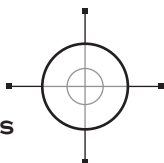
What is the formula for tangent?



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TRIGONOMETRY

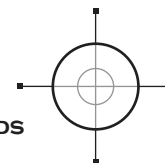
What is the formula for the secant?



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TRIGONOMETRY

What is the formula for the cotangent?

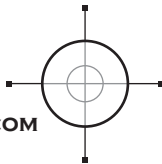


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Pythagorean Identity

$$\sin \theta = \sqrt{1 - \cos^2 \theta} \text{ and}$$

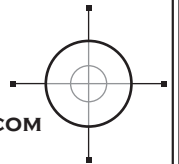
$$\cos \theta = \sqrt{1 - \sin^2 \theta}$$



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Pythagorean Identity

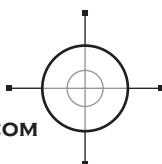
$$\tan \theta$$



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Pythagorean Identity

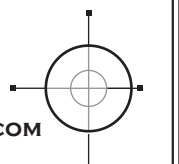
$$\sec^2 \theta$$



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Pythagorean Identity

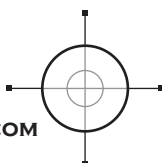
$$\csc^2 \theta$$



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Trigonometric Identities

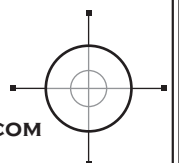
$$\begin{array}{ll} \sin(-\theta) = -\sin \theta & \cos(-\theta) = \cos \theta \\ \tan(-\theta) = -\tan \theta & \csc(-\theta) = -\csc \theta \\ \sec(-\theta) = \sec \theta & \cot(-\theta) = -\cot \theta \end{array}$$



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sine and cosine graphs

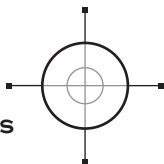
$$\begin{array}{l} y = a \sin b\theta \text{ and} \\ y = a \cos b\theta \text{ and} \end{array}$$



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TRIGONOMETRY

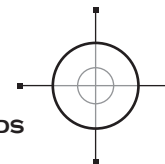
$$\frac{\sin \theta}{\cos \theta}$$



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TRIGONOMETRY

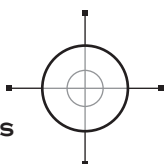
$$\sin^2 \theta + \cos^2 \theta = 1, \text{ so...}$$



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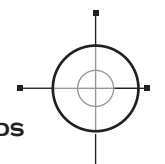
$$1 + \cot^2 \theta =$$



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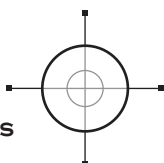
$$1 + \tan^2 \theta =$$



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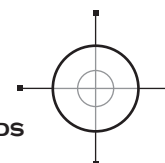
What are the formulas
for sine and cosine graphs?



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What are the
trigonometric identities?



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