Fractions

- Adding and Subtracting
  - Need common denominator
  - Add or subtract on top, keep denominator
- Multiplication
  - Improper fractions first
  - Multiply top AND bottom
    - Simplify and multiply or multiply and simplify
- Division
  - Keep, change, flip – K.C.F.
  - Then multiply

Operations with Postive and Negative Numbers

- Adding and Subtracting
  - Negative plus negative – REALLY negative!
  - Different signs – sign of answer determined by "larger" number
  - Adding a negative is the same as subtracting
    Ex. 6 + (-8) = 6 - 8
  - Minus a negative is plus
    Ex. 3 – (-4) = 3 + 4
- Multiplication and Division
  - Same signs – answer is positive
  - Different signs – answer is negative
  - Bigger or smaller doesn't matter

Order of Operations and Exponents

- Order of Operations
  - PEMDAS
  - Multiply/Divide and Add/Subtract L->R
- Exponents
  - What is being taken to the exponent?
    - $-4^3 \neq (-4)^3$
  - Pull it apart to simplify if you're not sure.
    - Multiplying – add exponents
    - Dividing – subtract exponents
    - Power to a power – multiply exponents

FOIL, Distributive Property, Like Terms

- FOIL – first, outer, inner, last
  - Multiplying two binomials
  - Ex. (x – 4)(x + 3)
- Distributive Property
  - Multiply number outside parenthesis by EVERY term inside
  - Minus signs go with number that follows
  - Ex. 4(x – 7) = 4(x + (-7))
- Like Terms
  - Must have the same variable(s) to the same exponent
  - Ex. 4x, -7x 3, 9 $5xy^2$, $-11xy^2$

Writing and Solving Inequalities

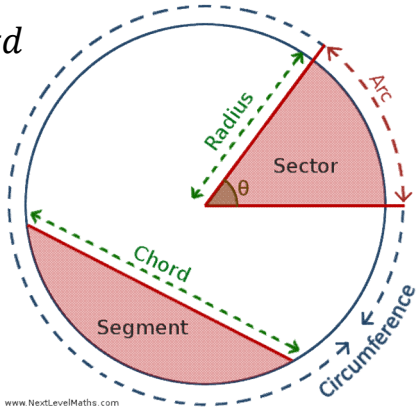
- Read the Symbols
  - <, ≤, ≥, >
  - "L" less than
- Writing Inequalities
  - Not sure, pick something you know works and write inequality
  - Careful: "at least", "no more than", "no less than", etc.
  - No fighting inequalities! < x > can never be true!
- Solving
  - Just like equations, except…
    - When multiplying or dividing by a negative on BOTH sides
    - Write final answer with variable first. Ex. 4 < x is x > 4.
- Graphing on Number Line
  - < >, open circle || ≤ ≥, filled in circle
  - Numbers under line should work
  - Follow the inequality symbol IF the variable is written first.

Solving Absolute Value Equations

- A Number's Distance From Zero
  - Always positive
- Solving
  - Isolate the absolute value
  - Write two equations
    - 1. Easy one – forget the absolute value
    - 2. Second one – take the opposite
  - Solve
  - Check by plugging back in
    - Watch for negatives: Ex. $|x - 3| = -2$ Not possible!

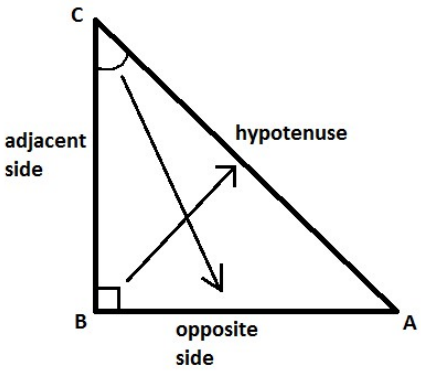
Circles

- Vocabulary
- Perimeter… circumference -> $2\pi r$ or πd
- Area… square units -> πr^2
- 360 degrees



SOHCAHTOA

- Right triangles
- Can be used to find missing sides and/or angles



$$\sin c = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{AB}{AC}$$

$$\cos c = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{BC}{AC}$$

$$\tan c = \frac{\text{opposite}}{\text{adjacent}} = \frac{AB}{BC}$$

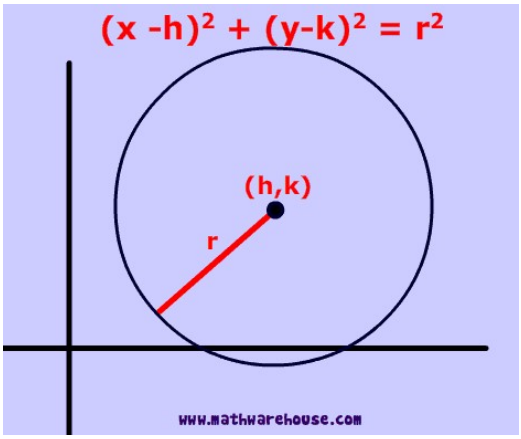
$$\cot c = \frac{\text{adjacent}}{\text{opposite}} = \frac{BC}{AB}$$

$$\sec c = \frac{\text{hypotenuse}}{\text{adjacent}} = \frac{AC}{BC}$$

$$\csc c = \frac{\text{hypotenuse}}{\text{opposite}} = \frac{AC}{AB}$$

Circle Equation

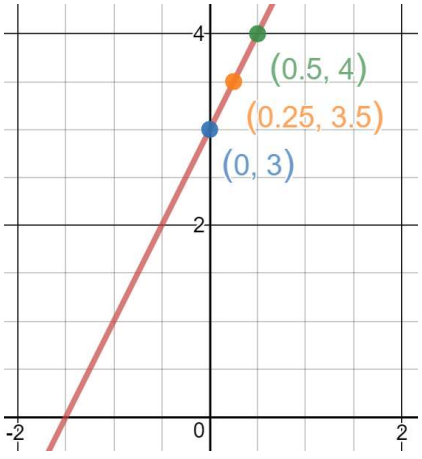
- Graphing circles on coordinate plane.
- Need center and radius.
- Careful with negatives…
  Ex. $(x - 3)^2 + (y + 2)^2 = 25$
  center: (3, -2), radius: 5



Graphing on Coordinate Plane

$y = 2x + 3$

- A picture is worth a 1,000 words!
- All possible ordered pairs that are solutions (x, y) to the equation.
- Shortcuts
  - y = mx + b
  - Can ALWAYS plug in values to get ordered pairs.
- Technology



Formulas

- When do we use these?

$SA = ph + 2B$ $SA = \pi rl + \pi r^2$ $SA = 4\pi r^2$	SA = surface area B = area of base h = height p = perimeter r = radius l = slant height
$V = Bh$ $V = \frac{1}{3}Bh$ $V = \frac{4}{3}\pi r^3$	V = volume B = area of base h = height r = radius

Pythagorean Theorem	$a^2 + b^2 = c^2$
Distance formula	$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
Quadratic formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Trigonometric Relations	$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}}$ $\cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}}$ $\tan\theta = \frac{\text{opposite}}{\text{adjacent}}$
$A = \pi r^2$ $C = \pi d$	A = area C = circumference d = diameter r = radius

Domain, Range and Excluded Values

- Domain: x-values (what we can put into the equation)
  - Watch out for things we can't do
    - Examples: divide by zero, take square root of a negative
- Range: y-values (what we get out of an equation)
  - What numbers are possible to get out?
    - Examples: can't get a negative out of an absolute value
- Excluded Values
  - Values that get us into "trouble"
- Hint: Graph it!

Word Problems

- What is the problem asking for?
- What do we know?
- Strategies
  - Draw a picture
  - Look at a similar problem
  - Pick some "easy" numbers to work with
  - Read the problem several times
- Does answer make sense?
- Did we answer the whole question?

Logarithms

- Answer to a logarithm is an exponent.
- Inverse of exponential

	Logarithm	=	Exponent
	$\log_a N = x$	$\Longleftrightarrow$	$N = a^x$
(Common Log)	$\log N = x$	$\Longleftrightarrow$	$N = 10^x$
(Natural Log)	$\ln N = x$	$\Longleftrightarrow$	$N = e^x$