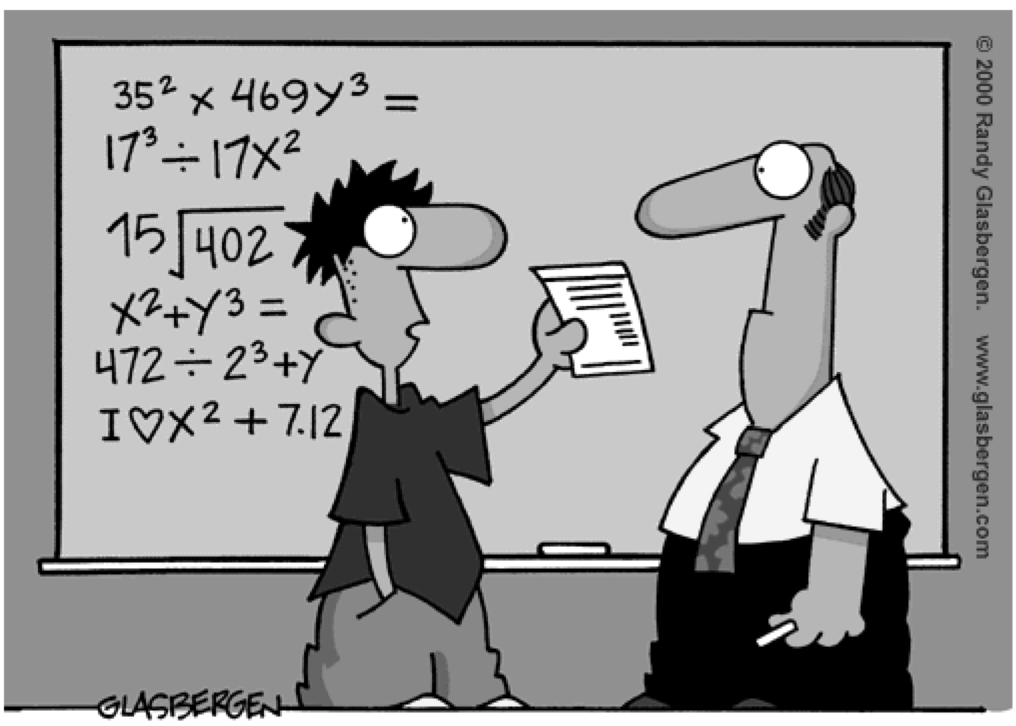
MBF 3C1
Grade 11 College Math

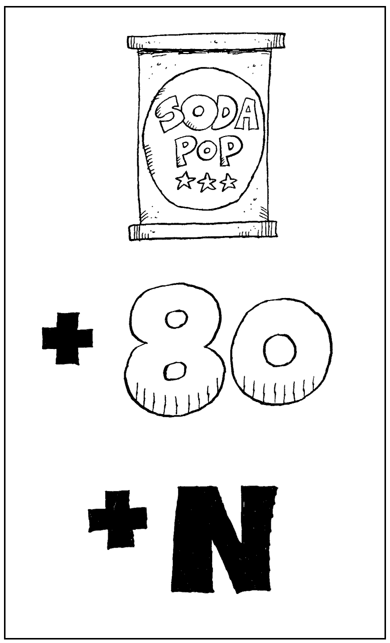
Review

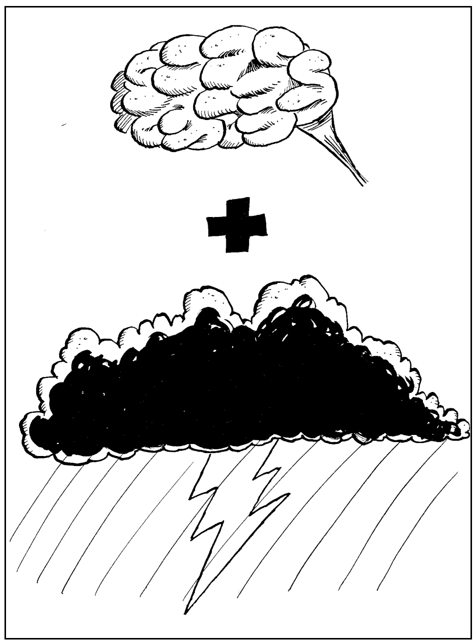


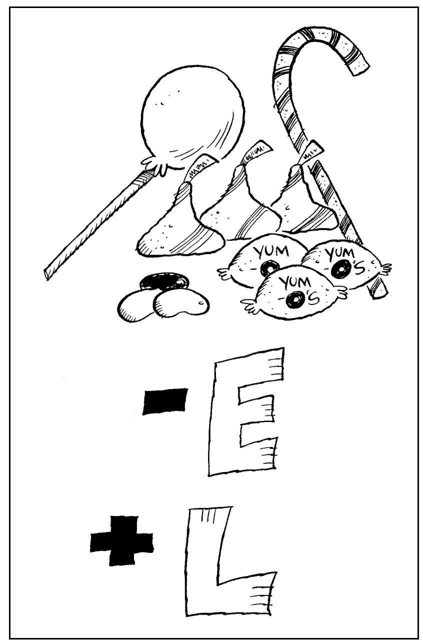
"I HAD MY DOCTOR DO A D.N.A. BLOOD ANALYSIS. AS I SUSPECTED, I'M MISSING THE MATH GENE."

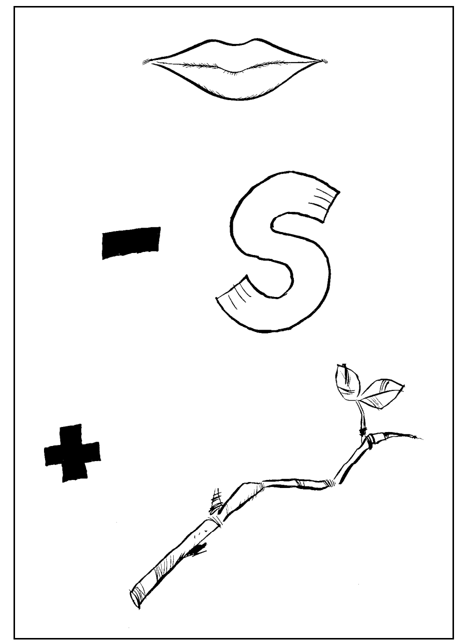
Word Equations

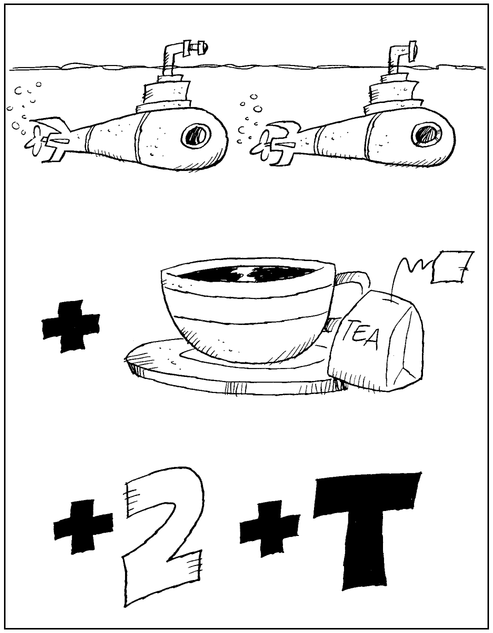
Use the pictures to determine each word or phrase.







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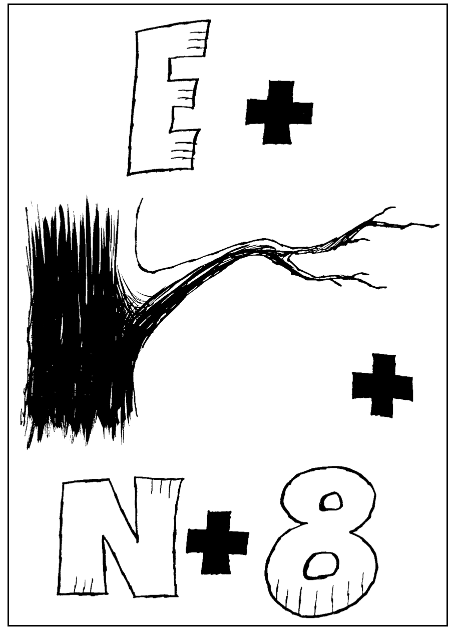
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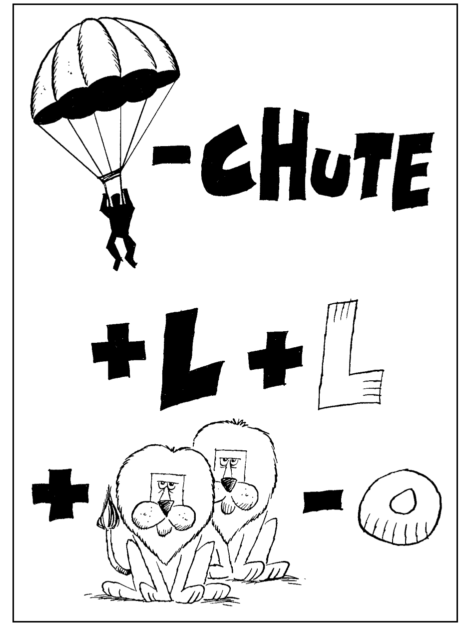
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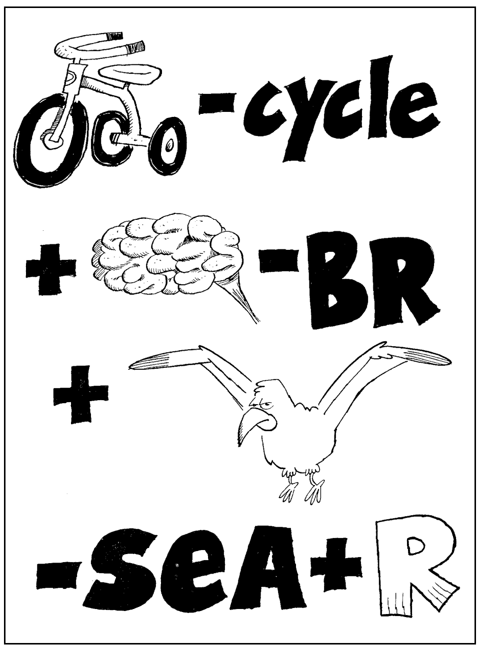
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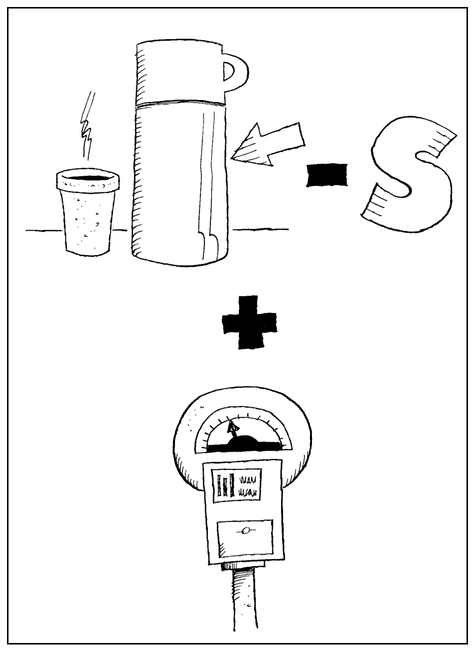
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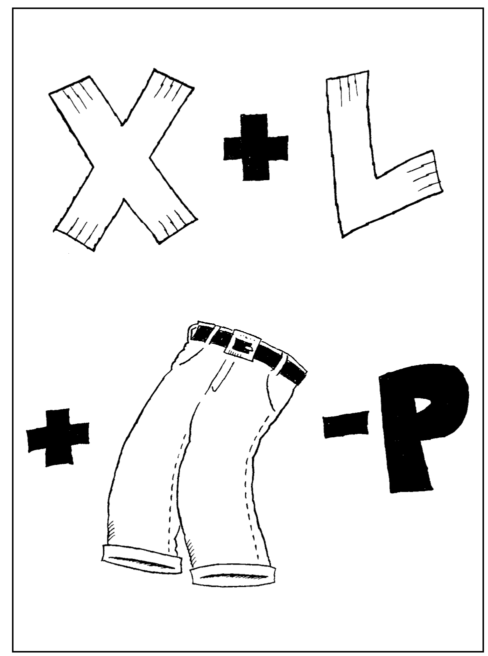
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Review: Integers

Multiplying and Dividing Integers

Rules:

$(+)(+)=(+)$ $\quad$ $(+)(-)=(-)$

$(-)(-)=(+)$ $\quad$ $(-)(+)=(-)$

Examples

$(-2)^2$ $\quad$ -2^2 $\quad$ $-8\div(-2)$ $\quad$ -8×2

Adding and Subtacting Integers – TRAVEL ALONG A NUMBER LINE

Rules:

$(+)\ and\ (+)=(+)$ $\quad$ $(+)\ and\ (-)=(\text{sign of the bigger})$

$(-)\ and\ (-)=(-)$ $\quad$ $(-)\ and\ (+)=(\text{sign of the bigger})$

Examples

$5-6$ $\quad$ $-5-6$ $\quad$ $-5-(-6)$ $\quad$ $-5+19$

Order of Operations with Integers

Brackets
Exponents
Division or
Multiplication in the order they appear
Addition or
Subtraction in the order they appear

Examples

$40-36\div 3^2\times(8\div 2)+1$ $\quad$ $-24\div 4\times(-2)-5(-3-1)^2$ $\quad$ $-8(-4)\div 2-(-3)(-2)$

Review: Fractions

Reminders

- A negative sign in a fraction means that the whole fraction is negative regardless of where it appears.

  $$-\frac{1}{2}=\frac{-1}{2}=\frac{1}{-2}$$

  It is always a good idea to move the negative out of the denominator when working with fractions.

- To convert a mixed number to an improper fraction, multiply the whole number by the denominator and add to the numerator.

  $5\frac{1}{3}$ $\qquad$ $-8\frac{1}{4}$

  To convert an improper fraction to a mixed number, divide the numerator by the denominator and pull the whole number out of the fraction. The left over is the new numerator.

  $\frac{11}{3}$ $\qquad$ $-\frac{22}{5}$

Adding and Subtacting Fractions

1. Change all mixed fractions to improper fractions. → can skip this step but may have to borrow + record in proper form
2. Move negative signs into numerators (and get rid of double signs).
3. Change all fractions so they have the same denominator (LCD).
4. Add and subtract ONLY numerators using the same rules as adding and subtracting integers.
5. Put answer in lowest terms.

Examples

$\frac{3}{8}+\frac{1}{4}$ $\qquad$ $\frac{3}{-2}-\frac{1}{-14}-1\frac{2}{7}$ $\qquad$ $5\frac{1}{5}-1\frac{2}{3}$

Multiplying Fractions

1. Change all mixed fractions to improper fractions.
2. Move negative signs into numerators (and get rid of double signs).
3. Multiply numerators together and denominators together using the same rules as multiplying integers.
4. Put answer in lowest terms. → there's a fast way to reduce

Examples

$\frac{3}{5}\times\frac{-4}{7}$ $\qquad$ $\left(\frac{4}{5}\right)\left(-1\frac{7}{8}\right)$ $\qquad$ $2\frac{4}{7}\times1\frac{5}{9}$

Dividing Fractions

1. Change all mixed fractions to improper fractions.
2. Move negative signs into numerators (and get rid of double signs).
3. Change division to multiplication and change the fraction after the operation sign to its reciprocal. (For example, $\frac{2}{3} \to \frac{3}{2}$, $\frac{4}{9} \to \frac{9}{4}$, etc.)
4. Follow the steps for multiplying fractions.
5. Put answer in lowest terms.

Examples

$\frac{6}{5} \div \frac{-3}{2}$ $\qquad$ $3 \div \frac{1}{10}$ $\qquad$ $\frac{18}{5} \div 4\frac{1}{2}$

Order of Operations with Fractions

Brackets
Exponents
Division or
Multiplication in the order they appear
Addition or
Subtraction in the order they appear

Examples

$53\frac{1}{2} - \left(\frac{-3}{4}\right)$ $\qquad$ $\left(-\frac{3}{4} - \frac{7}{10}\right) \div \left(\frac{3}{10} \times 4\frac{1}{6}\right)$

Review: Algebra & Solving Equations

___________________ have variables that are identical in every way
___________________ have variables that are not the same
The ___________________ allows you to multiply a term outside a bracket by each term inside the bracket
A ___________________ is a mathematical expression containing terms being added and/or subtracted.
A polynomial with 2 terms is a ________________, and a polynomial with 3 terms is a ________________.
A __________is a number grouped with one or more variables. It is also known as a __________________.

Simplifying Algebraic Expressions

1. Remove brackets. Use the distributive property where necessary: $a(b + c) = ab + ac$.
2. Collect like terms.
3. Add/subtract like terms. For multiplication/division, terms do NOT need to be like, just combine like bases.

$4x^2+6x-3+4x-10x^2+6$	$(3x^2+4y-6)-(10x^2-12y-1)$	$(2y^2+5y+2)-(-y^2+3y+2)$
$15-3(x+4xy)-6(2x+3xy)$	$2(4x^2+6x-3)+6x^2$	$(4x^2y)(3xy^4z)$
$16xy^2 \div 8y$	$\dfrac{9x^3y^2+18xy-6x^2y^3}{3xy}$	$2x(3x-1)-4x(6x+5)$

Steps for solving equations:

1. Simplify both sides of the equation if possible.
   - remove brackets using the distributive property
   - remove fractions by multiplying every term by the LCD
2. Use inverse operations to group variables on one side of equation and constants on the other (BEDMAS backwards).
3. Use inverse operation to isolate variable.
4. Check your answer.

Note: Use proper form – there should be only 1 equal sign per line
– all equal signs should line up vertically

Examples

$-8 = 3n - 14$

$y + 6(y - 3) = 5(y + 2)$

$\frac{3}{4}t - 2 = 7$

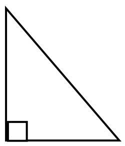
$\frac{3x - 2}{4} = 5$

$\frac{3}{4}t - 2 = \frac{1}{2}(t + 2)$

Review: Trigonometry

Pythagorean Theorem

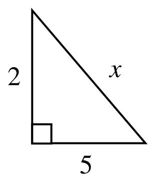
The Pythagorean Theorem is used to find a missing *side length* in a **right triangle**.

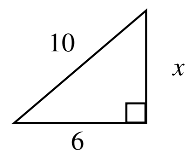


***c* =** ______________________________

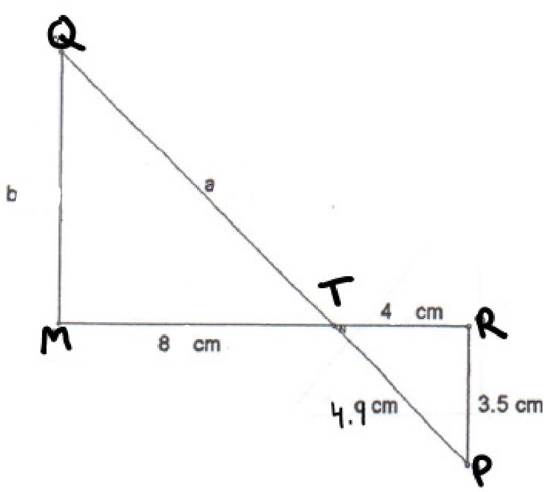
is the longest side of a right triangle, always across from the right angle.

Calculate the missing side in each triangle.





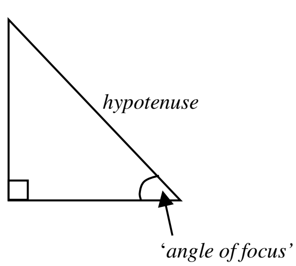
Similar Triangles

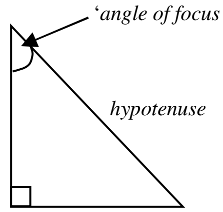


Your calculator **must** be in degree (DEG) mode for trigonometry.

Trigonometry

The primary trigonometric ratios are used to find *side lengths* or *angle measures* in **right triangles**.





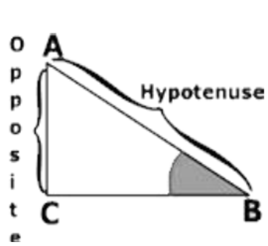
Hypotenuse – across from the right angle

__________ **Side** – across from the slope angle

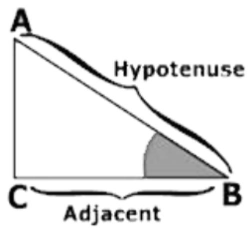
__________ **Side** – adjacent to the slope angle

To solve primary trigonometric problems:

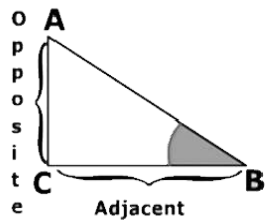
1. Choose the 'angle of focus' (the angle given or required).
2. Label the sides (opposite, adjacent and hypotenuse).
3. Choose the appropriate trig ratio based on the information you have → **SOH-CAH-TOA**.
4. Sub in known values and solve for unknown.



$$\sin(B) = \frac{opposite}{hypotenuse}$$



$$\cos(B) = \frac{adjacent}{hypotenuse}$$

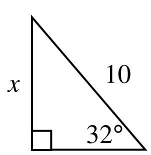


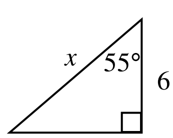
$$\tan(B) = \frac{opposite}{adjacent}$$

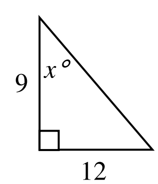
Reminders:

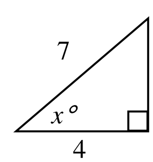
- when solving for a ____________, use sin, cos or tan on your calculator, then cross multiply
- when solving for an _____________, use $\sin^{-1}$, $\cos^{-1}$ or $\tan^{-1}$ on your calculator

Calculate the missing side or angle indicated in each triangle.









Review: Geometry & Measurement

Geometry

Complementary

Supplementary (line and C-pattern)

Angle Sum Theorem

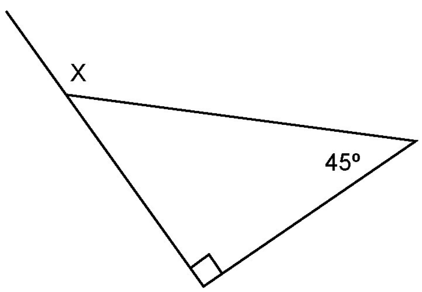
Opposite Angles (X-pattern)

Corresponding angles (F and Z)

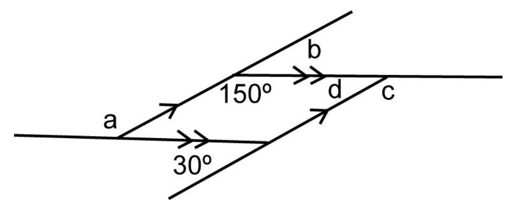
Isosceles Triangle

Find missing angles:

1.



2.



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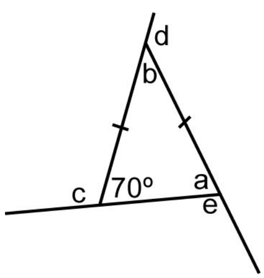

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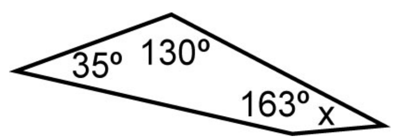


Perimeter & Area

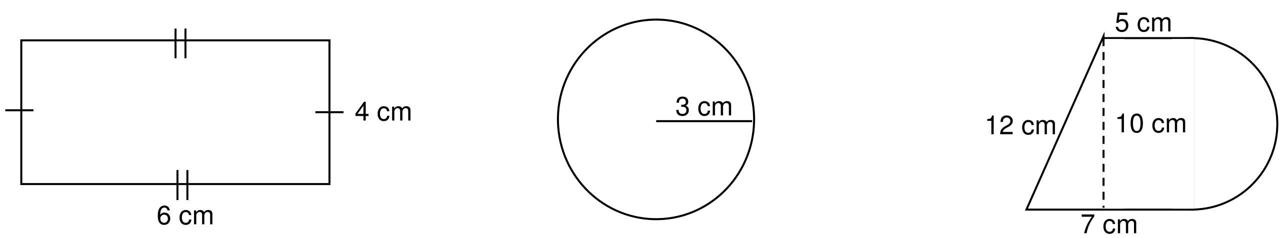
Perimeter – ____

Square	Rectangle	Triangle	Circle	Irregular shapes
$P = 4s$	$P = 2l + 2w$	$P =$ sum of all sides	$C = 2\pi r$ or $C = \pi d$	Add all outside sides together.

Area – ____

Square	Rectangle	Triangle	Circle	Irregular shapes
$A = s^2$	$A = lw$	$A = \frac{bh}{2}$	$A = \pi r^2$	Divide the shape into smaller regular shapes and add all the areas together.

Find the perimeter and area of each shape.



Surface Area & Volume

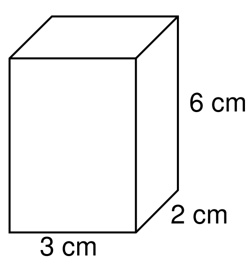
Surface Area – ____

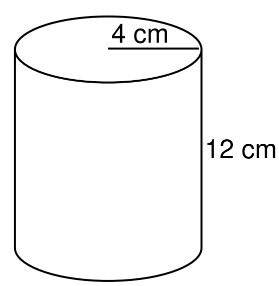
Rectangular Prism	Cylinder
$SA = 2lw + 2lh + 2wh$	$SA = 2\pi r^2 + 2\pi rh$

Volume – ____

Rectangular Prism	Cylinder
$V = lwh$	$V = \pi r^2 h$

Find the surface area and volume of each shape.





Review: Quadratics

1. Expand and simplify

a. $(-2t - r)(-3t + r)$

b. $(5q - 8r)^2$

2. Factor each of the following

a. $3x^2 - 6x$

b. $d^2 - 12d + 35$

c. $121x^2 - 9y^2$

3. For the quadratic $y = -2(x-4)(x+6)$ calculate the following

a. the *y*-intercept

b. the zeros

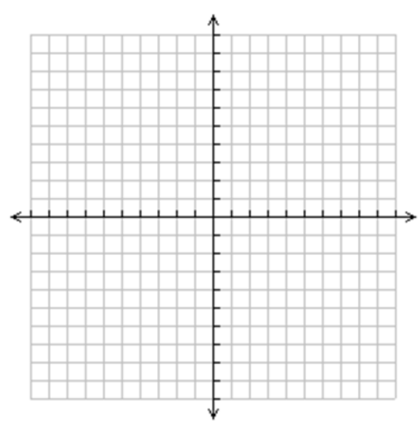
c. the axis of symmetry

d. the optimal value

e. vertex

f. sketch

label vertex, zeros and y-int

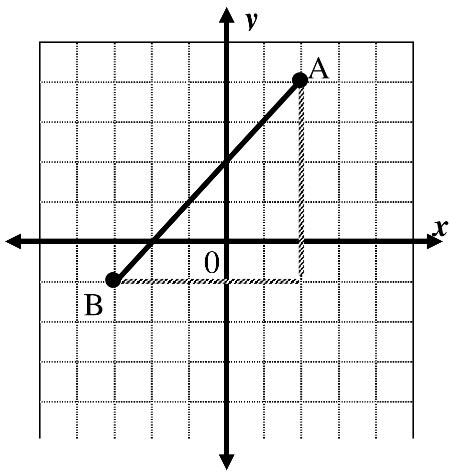


Review: Linear Relations

Finding Slope

Slope is the measure of steepness of a line. It is also referred to as rate of change.

USING A GRAPH



Slope is the comparison of vertical and horizontal lengths of the line.

The vertical length is known as **rise**.
The horizontal length is known as **run**.

The slope can be calculated with:

$$m = \frac{rise}{run}$$

$$m = \frac{\quad}{\quad}$$

$$m =$$

Note:

- If the line points **up** from left to right, the slope is **positive**.
- If the line points **down** from left to right, the slope is **negative**.

USING COORDINATES

$$\boldsymbol{m = \frac{\textit{difference in y - coordinates}}{\textit{difference in x - coordinates}}}$$

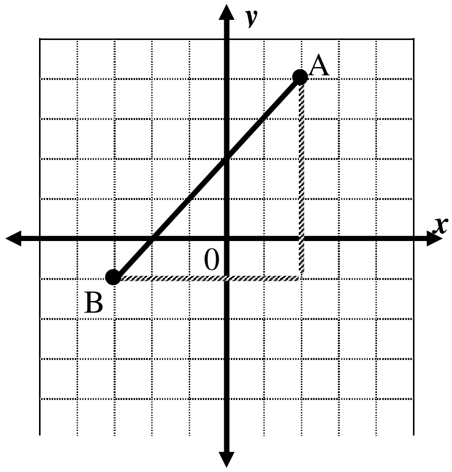
$$\boldsymbol{m = \frac{\Delta y}{\Delta x}}$$

$$\boldsymbol{m = \frac{y_2 - y_1}{x_2 - x_1}}$$

Calculate the slope of the line between the points A(2, 4) and B(-3, -1).

Finding the Y-Intercept

USING A GRAPH



The y-intercept is the point where the line crosses the y-axis.

Look at the y-axis and determine where the line crosses.

The point at the *y*-intercept is _________.

The *y*-intercept is _________.

Equation of the line is: y = ___ x + ___

USING AN EQUATION

1. Put the equation in the form $y = mx + b$.
2. b is the *y*-intercept.

Calculate the *y*-intercept of $x - 2y + 8 = 0$

USING 2 POINTS

1. Find slope.
2. Use $y = mx + b$ to solve for b.

Find the *y*-intercept of the line between (6, 3) and (4, 13).

Finding the Equation of a Line

To determine the equation of a line the slope (rate of change) and (*y*-intercept) are required.

1. Find the slope (m) and *y*-intercept (b) using the methods outlined above.
2. Substitute the values of m and b into the generalization $y = mx + b$.
3. Rearrange the equation so it is in standard form ($ax + by + c = 0$).
   (a standard form equation must not have fractions and the x-value should be positive)

State the equation of a line if slope is $^{-1}/_{3}$ and the *y*-intercept is 6.

Graphing Lines Using Slope and y-Intercept

1. Find the *y*-intercept (*b*).and plot it in the *y*-axis.
2. Find the slope (*m*) and plot it using $^{rise}/_{run}$.
   (rise up or down and always run right)
3. Connect the points with a straight line

$y = -\,^{3}/_{2}x + 5$