

*Exponents**7 Important Rules:*

1. Multiplying like bases: $x^a \cdot x^b =$

2. Dividing like bases: $\frac{x^a}{x^b} =$

3. Raising exponents to other exponents: $(x^a)^b =$

4. Zero Powers (as long as $x \neq 0$): $x^0 =$

5. Fractional Exponents: $x^{\frac{a}{b}} =$

6. Negative Exponents I: $x^{-a} =$

7. Negative Exponents II: $\frac{1}{x^{-a}} =$

Example: Rewrite/Simplify each expression.

a) $\sqrt{x} =$

b) $x^{-\frac{1}{2}} =$

c) $\frac{1}{2}(3+x^2)^{-\frac{1}{2}} \cdot (2x) =$

Factoring

Example: Factor each expression:

a) $x^2 - 16$

b) $x^2 - x - 6$

c) $8x^2 - 2x - 15$

d) $(x-1)^2(x+2) + (x-1)(x+2)^2$

e) $x^3 - 3x^2 - x + 3$

Functions

Definition:

Example: How do you tell whether or not a given graph is a function? _____

Domain: _____

Range: _____

Things to look for when finding the domain of a function:

1. Not allowed to have a zero in the denominator of a fraction
2. Not allowed to have negative numbers inside a square root.
3. Not allowed to have negative numbers or 0 inside a logarithm function.

Example: Give the domain of each function below.

a) $y = \frac{x^2 + 20}{(x-2)(x+7)}$

b) $y = \frac{x}{\sqrt{3x+6}}$

Function Notation

Example: If $f(x) = 2x^2 - 2x + 1$, answer the following:

a) $f(a) =$

b) $f(h) =$

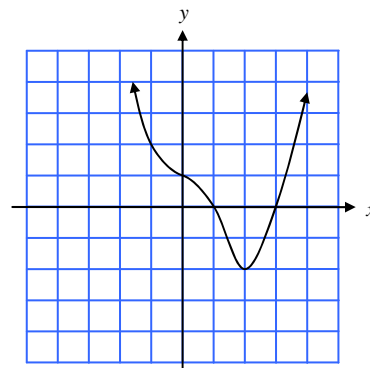
c) $f(-2) =$

d) $f(a+h) =$

Example: Consider the graph to the right.

a) What does $f(0) =$

b) Where does $f(x) = 0$?



Types of Functions

You should be able to graph the following functions without a calculator.

a) $f(x) = \frac{x}{x+2}$

b) $g(x) = 3x - 1$

c) $h(x) = \sqrt{x-2}$

d) $u(x) = \sqrt[3]{x}$

e) $s(x) = -2x^2 - 4x - 6$

f) $q(x) = e^x$

g) $j(x) = \log_5 x$

h) $k(x) = |x-2| + 3$

i) $r(x) = (x-3)^2 + 4$

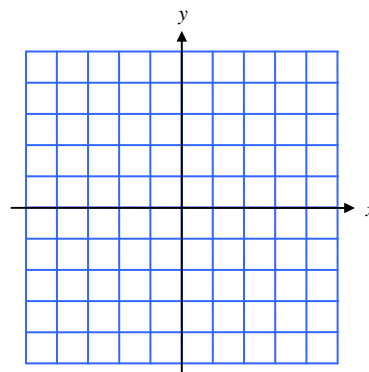
j) $y = 5$

k) $x = -7$

Piecewise Functions

Functions defined in parts with limited domains.

Example: Graph $f(x) = \begin{cases} -x+1 & ; x < -1 \\ 3x-2 & ; -1 \leq x \leq 2 \\ x^2 & ; x > 2 \end{cases}$

*Linear Functions*

To write the equation of a line you Need Two Things:

1) _____

2) _____

Use Point-Slope Form to begin: _____

Example: Write the equation of the line that passes through the point (5, -3) and has slope = -2.

Example: Rewrite the equation above in Slope-Intercept Form.

The formula for finding slope between two points is _____.

The slope between any two points is the _____.

Example: Suppose you purchased a house in 2005 for \$260,000. You were able to sell your house this year for \$230,000. If we assume the depreciation of your house followed a linear pattern, write a linear equation that represents the value of your house. (Let V = value of your house, and t = the year).

Solve Equations

Example: Solve the following equation for x :

$$(x + 2)^2 = 2x^2 - 5x + 22$$

Example: Find the equilibrium point if the supply function = $\sqrt{x+3}$ and the demand function = $4 - 2x$.

a) Find the answer algebraically

b) Check your answer(s).

c) Find the answer graphically.

Direct and Inverse Variation

We say two quantities a and b vary _____ (or are _____) if the quantities can be related by the equation

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Example: The quantity sold, x , of a plasma TV is inversely proportional to the price, p . If 8500 plasma televisions are sold for \$2900 each, how many would be sold if the price is changed to \$850 each?

Example: The weight F of fluids in a human is directly proportional to body weight W . It is known that a person who weighs 180 lb has 120 lb of fluids. Find an equation of variation expressing F as a function of W .