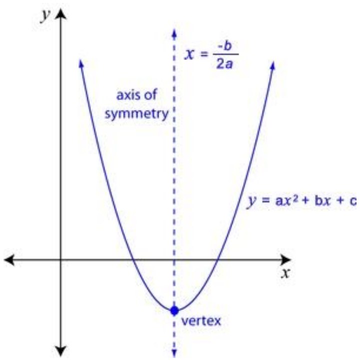
Module 2 Review/Study Guide

2.1) Minimum of a equation- the lowest coordinate on a graph

Maximum- the highest coordinate on a graph

Vertex=the axis of symmetry



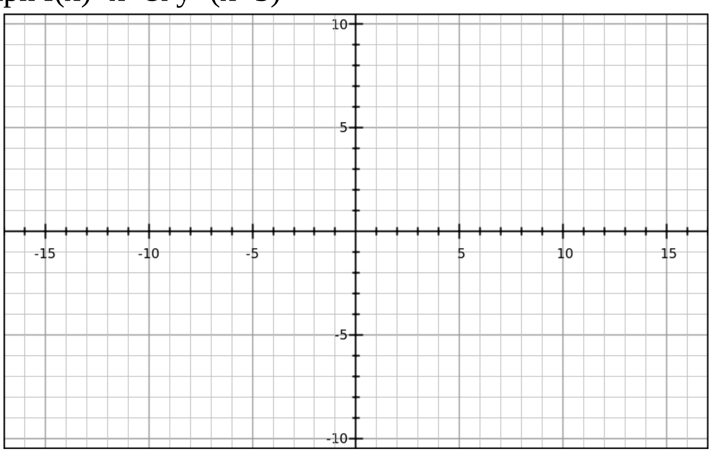
F(x)+b= f(x) moved up b units.

F(x)-b= f(x) moved down b units.

F(x+b)= shifted b units to the left

F(x-b)= shifted b units to the right

Graph $f(x)=x^2$ & $y=(x+3)^2$



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2.2). $Y= a(x-h)^2+k$

Vertex:(h,k)

- Standard form- $y=ax^2+bx+c$

Make equation into Standard form by multiplying

Y=(x+6)(x+6).

Y=(3x-2)(3x-2)

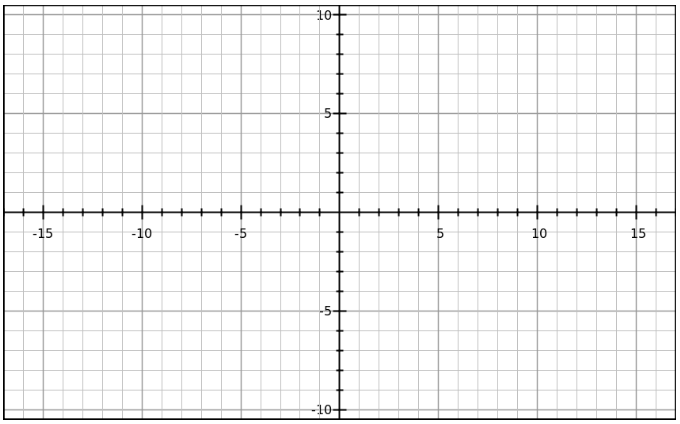
2.3) To find x-intercept in function equation set y equal to zero and solve.

0 = 3x2 + x – 2

0 = (3x – 2)(x + 1)

$3x - 2 = 0$ or $x + 1 = 0$
$x = 2/3$ or $x = -1$

To find y-intercept in function equation set x equal to zero & solve.
$y = 3(0)2 + (0) - 2$
$= 0 + 0 - 2 = -2$
Find x intercept & y intercept & graph equation.
$3x+2y=12$



A) x-intercept-
B) Y-intercept-

Completing the square-you multiply the function by itself by distributing.
Example- $(x+5)(x+5)$
$x^2+5x+5x+25$
$x^2+10x+25$
Complete the square
$(3x+7)(3x+7)$. $(9x+1)^2$

2.4). A perfect square is the product of a polynomial multiplied by itself.
Ex: $(3x + 2y)2$
$= 9x2 + 12xy + 4y2$

Determine if each expression below is a perfect square.
$A(x)=x^2+10x+14$

$A(x)=2x^2+16+6$

$A(x)=3x^2+18-12$

2.5) When working with the vertex form of a quadratic function,

$h=\frac{-b}{2a}$ and $k=f(h)$

The "a" and "b" referenced here refer to f (x) = ax2 + bx + c.

Example : y = 2x2 - 4x + 5

a = 2 and b = -4

$$h=\frac{-(-4)}{2(2)}=\frac{4}{4}=1$$

$$k=2(1)^2-4(1)+5=3$$

Vertex: (1,3)

Vertex form: y = 2(x - 1)2 + 3

Change the form of the equation to vertex form:. State the vertex and graph the parabola. Show at least 3 accurate points on each side of the line of symmetry.

$y=x^2-4x+1$

2.6) Factoring trinomials steps:

Step 1 : Observe the values of a, b, and c; a is the coefficient of x2, b is the coefficient of x, and c is the constant.

Step 2 : If a = 1, then find all the factor pairs(including negative factors also) for the term c, else multiply a(coefficient of x2) with c(constant term) and then find the factor pairs.

Step 3 : Now, determine which factor pairs sums up to the middle term b.

Step 4 : Make the expression into two binomials.

Example:$x^2 + 2x + 3x + 6$

Use values from the chart above. Replace 5x with 2x + 3x.

(x2 + 2x) + (3x + 6).

x(x + 2) + (3x + 6)

x(x + 2) + 3(x + 2)

(x + 2)(x + 3)

Answer: (x + 2)(x + 3)

Factor the following trinomials

$x^2+11x+24$ $x^2+12x+36$

2.7) Factor the following quadratics.

x^2+9x+8 x^2-6x+8

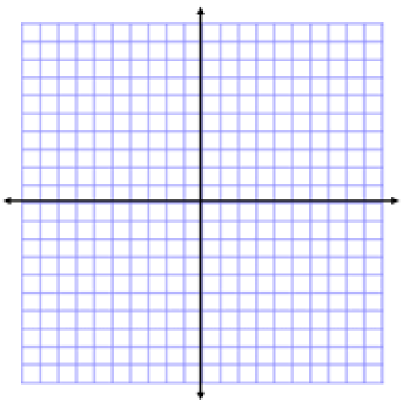
Here are the steps required for Graphing Parabolas in the Form y = a(x – h)2 + k:

Step 1: Find the vertex. Since the equation is in vertex form, the vertex will be at the point (h, k).

Step 2:Find the y-intercept. To find the y-intercept let x = 0 and solve for y.

Step 3: Find the x-intercept(s). To find the x-intercept let y = 0 and solve for x. You can solve for x by using the square root principle or the quadratic formula (if you simplify the problem into the correct form).

Graph the following parabola.
$y=(x-1)^2-3$



2.8) Factored form a(x-r1)(x-r2)

•a is the direction of opening
•r1 and r2 are the x-intercepts
–Or roots, or zeros
•Example: -2(x-2)(x+0.5)
–a is negative, opens down.
–r1 is 2, crosses the x-axis at 2.
–r2 is -0.5, crosses the x-axis at -0.5

Module 3 Review/Study Guide

3.1)•Exponential Form
Ex: 5^3=5•5•5=125

Solve exponential forms.

2^{10} 11^5

Exponent functions- functions of the form $y=ab^x$

Example: $y=4.3(1.23)^x$ (Multiplication)

Arithmetic is an additive.

3.2) A very common radical expression is a square root. One to think of a square root is the number will multiply itself to create the value.

Example of simplifying

$\sqrt{20}=\sqrt{4 \cdot 5}=\sqrt{2 \cdot 2 \cdot 5}=2\sqrt{5}$

Simplify radicals.

$\sqrt{40}$ $\sqrt{72}$ $\sqrt{32}$

3.3) Exponential rules

$x^m / x^n = x^{m-n.}$ $(x,y)^n = x^n y^n$

$(x^m)^n = x^{mn}$ $x^{m/n} = {}^n\sqrt{\mathbf{x}^m}$

$x^0=1$ $(x/y)^n = x^n/y^n$

$x^{-n}=1/x^n$ $x^m x^n = x^{m+n}$

Exponential form

Ex: $5^3=5 \cdot 5 \cdot 5=125$

Solve Exponential forms

2^{10} 11^5

3.4) quadratic equation is $ax^2+bx+c=0$

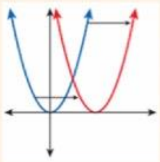
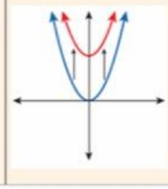
Example- $x^2+3x+2=0$

A=1

B=3

C=2

3.5) translations on graphs

Translations of Quadratic Functions	
Horizontal Translations	**Vertical Translations**
Horizontal Shift of $\lvert h \rvert$ Units	Vertical Shift of $\lvert k \rvert$ Units
 $f(x) = x^2$ $f(x - h) = (x - h)^2$ Moves left for $h < 0$ Moves right for $h > 0$	 $f(x) = x^2$ $f(x) + k = x^2 + k$ Moves down for $k < 0$ Moves up for $k > 0$

3.6)The Quadratic Formula: For $ax^2 + bx + c = 0$, the values of x which are the solutions of the equation are given by:

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

Example:Solve $x^2 + 3x - 4 = 0$

$$\begin{aligned} x &= \frac{-(3) \pm \sqrt{(3)^2 - 4(1)(-4)}}{2(1)} \\ &= \frac{-3 \pm \sqrt{9 + 16}}{2} = \frac{-3 \pm \sqrt{25}}{2} \\ &= \frac{-3 \pm 5}{2} = \frac{-3 - 5}{2}, \frac{-3 + 5}{2} \\ &= \frac{-8}{2}, \frac{2}{2} = -4, 1 \end{aligned}$$

Find x intercept using quadratic formula.

$x^2 - 2x - 4 = 0$

3.7) There are several methods you can use to solve a quadratic equations.

Factoring
Completing the Square
Quadratic Formula

Using any of these methods to solve these equations.

$x^2+4x-12=0$ $x^2-4x+1=0$ $(x-4)^2=3$

Module 4 Review/Study Guide

4.1) piecewise defined functions

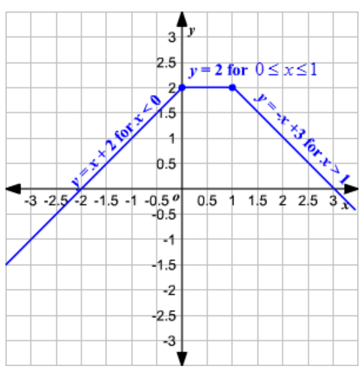
A piecewise-defined function is one which is defined not by a single equation, but by two or more. Each equation is valid for some interval.

Consider the function defined as follows.

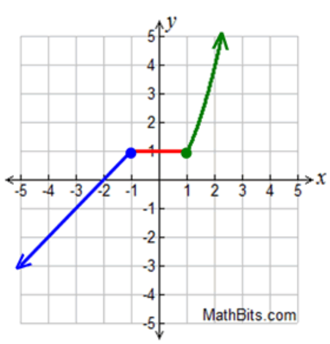
$x+2$ for $x<0$

$Y=\{2$ for $0<x<1$

$-x+3$ for $x>1$



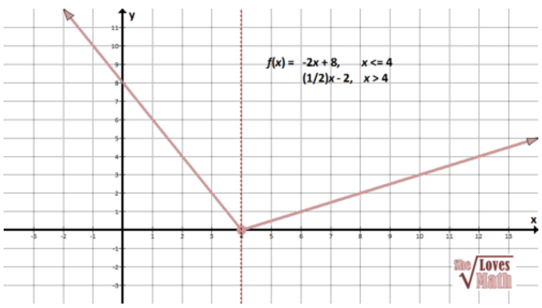
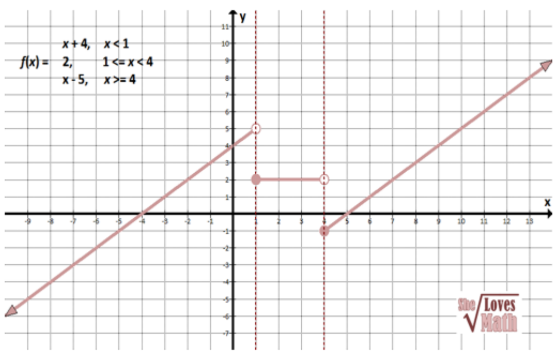
Write the price wise defined function for this graph.



4.2) how to find domain and ranges of price wise defined functions.

• Domain- looking at the graph you find the lowest x value and the highest x value and your domain will be (lowest x value, highest x value). If the x value is continuous towards the right then you write an infinity sign but if it continues to go to the left then it is a negative infirmity sign.

• Range- looking at the graph you look for the lowest y value and the highest y value. It will look like this- (lowest y, highest y) also if it continues to go upwards you put an infinity sign or if it goes down then negative infinity.

Piecewise Function	Graph
$f(x)=\begin{cases}-2x+8 & \text{if } x\le 4\\ \frac{1}{2}x-2 & \text{if } x>4\end{cases}$ **Continuous** **Domain:** $\mathbb{R}$, or $(-\infty,\infty)$ **Range:** $(0,\infty)$	
$f(x)=\begin{cases}x+4 & \text{if } x<1\\ 2 & \text{if } 1\le x<4\\ x-5 & \text{if } x\ge 4\end{cases}$ **Non-Continuous** **Domain:** $\mathbb{R}$, or $(-\infty,\infty)$ **Range:** $\mathbb{R}$, or $(-\infty,\infty)$	

4.3) Absolute Values

The absolute value of x, denoted "| x |" (and which is read as "the absolute value of x"), is the distance of x from zero. This is why absolute value is never negative.

Example of absolute value problems:

Simplify | 2 + 3(–4)|

| 2 + 3(–4) | = | 2 – 12 | = | –10 | = 10

Simplifying these absolute values problems:

$-|(-2)^2|$

$-|-4|$

4.4) simplify these problems.

$(-7-2\sqrt{5})+(6+8\sqrt{5})$.

$(-10-\sqrt{13})-(-11+5\sqrt{13})$

4.5) Inverse Functions

To find an inverse function you switch the x values with the y values and solve for y, the. Put it into inverse notation.

Example: $f(x)=2x-1$

$x=2y-1$

$1/2x+½=y$

$F^{-1}(x)= 1/2x+½$

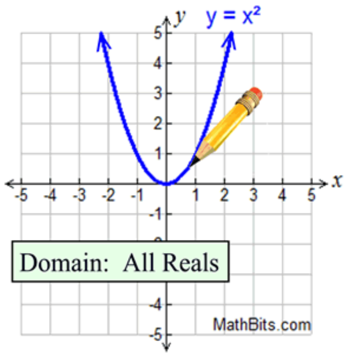
Find the inverse to this function.

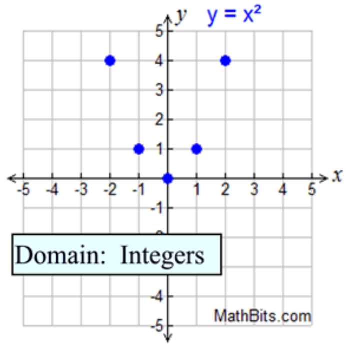
$F(x)=-2/3x+½$

4.6) Discrete and Continuous Functions

•A set of data is said to be continuous if the values belonging to the set can take on ANY value within a finite or infinite interval.

• A set of data is said to be discrete if the values belonging to the set are distinct and separate (unconnected values).





Graph the following functions. And write their domains and ranges

. $f(x) = x^3$;

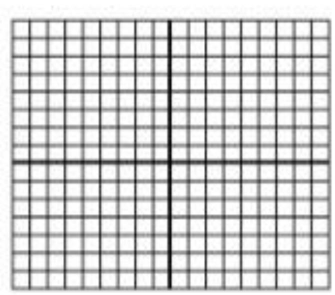
Domain:

Range:

$f^{-1}(x) =$

Domain:

Range:



4.7) write the piecewise of the following functions.

h(x)=|x+3|

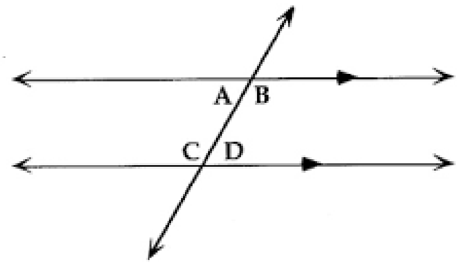
g(x)=5|x+3|

f(x)=|x^2-4|+1

Module 5.1 Review/Study Guide

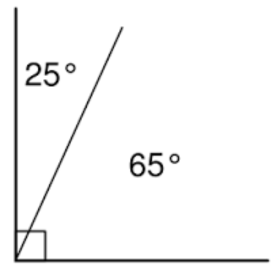
Imagine folding a circle exactly in half so that the fold passes through the center of the circle. This fold is called the diameter of the circle. It is a line segment with a length, but it is also a special kind of angle called a straight angle.

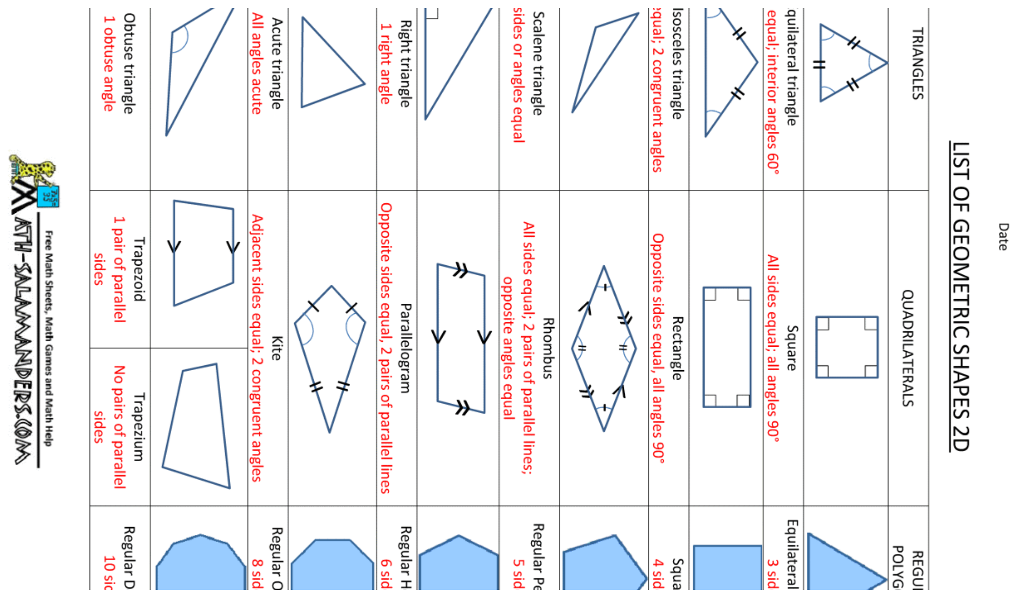
If two angles share a vertex and together they make a straight angle, then the two angles are called a linear pair.



$A + C = 180°$

$B + D = 180°$





Name the following shapes.