

Factoring a Difference of Two Perfect Squares

Example:

$$(x^2 - 9) = (x + 3)(x - 3)$$

$$(x^4 - 16y^2) = (x^2 + 4y)(x^2 - 4y)$$

Definition of a Function:

A relation where each input has exactly one output

Inequalities:

$y \geq$ means to draw a solid line and shade above the line.

$y \leq$ means to draw a solid line and shade below the line.

$y >$ means to draw a dashed line and shade above the line

$y <$ means to draw a dashed line and shade below the line

Rational/Irrational:

A *rational number* is a terminating decimal, or a number that can be written as a fraction.

An *irrational number* is a number that goes on forever, without repeating.

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

Another name for slope:
Average Rate of Change

Key things to know on your calculator:

LinReg(ax+b)

ZOOM 6

ExpReg

ZOOM 0

QuadReg

"How to Reset"

StatPlot (RESID)

DiagnosticOn

Edit... L1 and L2

2nd → TBLSET

1-Var Stats

"WINDOW"

abs(

2nd → CALC

Rules for Finding Zeroes/Roots:

(Always look for a GCF first!)

Factoring: Find two numbers that multiply to the c term and add to the b term.

Example:

$$x^2 - 4x - 12 \rightarrow (x + 2)(x - 6)$$

Completing the Square: Used to place in Vertex form. Convenient when a term is 1, and b term is an even number.

Step 1: "Move" the c term over.

Step 2: Divide the b term by 2, then square it.

Step 3: Add the result from Step 2 to both sides of the equation.

Step 4: Factor the trinomial and place in vertex form (the result of completing the square will always give you the vertex of a parabola...change the sign of the value inside parentheses, keep the value outside.

Example:

$$\text{Step 1: } x^2 - 18x = -72$$

$$\text{Step 2: } \left(\frac{-18}{2}\right)^2$$

$$\text{Step 3: } x^2 - 18x + 81 = -72 + 81$$

$$\text{Step 4: } (x - 9)(x - 9) = 9$$

$$\text{Vertex form: } y = (x - 9)^2 - 9$$

$$\text{Vertex: } (9, -9)$$

Quadratic Formula: Used when quadratic is not factorable.

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

Make sure to always write:

$$a = \quad b = \quad c =$$

Mr. Papetti's Ultimate Algebra I Guide to Success

Exponential Functions

$$y = ab^x$$

a = y -intercept, initial amount

b = growth factor if $b > 1$, decay factor if $0 < b < 1$

Exponential Growth/Decay Formula:

$$y = a(1 \pm r)^t$$

r = rate as a decimal NOT as a percent!

Compound Interest Formula:

$$y = a\left(1 \pm \frac{r}{n}\right)^{nt}$$

Shifts

Add Inside (move to left)

Add outside (move up)

Multiply $a > 1$ (narrower)

Subtract Inside (move to right)

Subtract outside (move down)

Multiply $0 < a < 1$ (wider)

Domain: all of the x -values

Look for max and min left and right

Range: all of the y -values

Look for max and min up and down