

Introduction to Quadratic Equations

In mathematics, a quadratic equation is a polynomial of second degree that can be written in the form:

$$y = ax^2 + bx + c \quad \text{where } a \neq 0$$

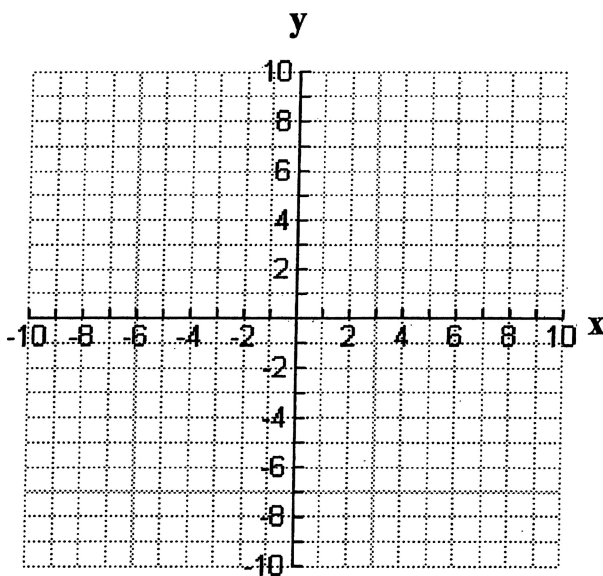
Quadratic equations are most noticeable because they have an ' x^2 '.

On a graph, a quadratic equation makes a U-shaped curve called a parabola.

Example:

Fill in the following table of values and use it to graph $\rightarrow y = x^2$

x	$y = x^2$
-3	
-2	
-1	
0	
1	
2	
3	



Quadratic equations have many real world applications.

For example:

- relates the height of an object thrown in the air as time elapses
- to relate the amount of profit from selling a product vs. selling price
- finding the sides of right triangle with Pythagoras
- communications (the parabolic receiver/ satellite dish)

Multiplying Monomials

A quadratic equation is produced whenever the variable 'x' is multiplied by another 'x'.

Practice (Multiplying Monomials)

Simplify the following equations:

a) $y = x(x)$

b) $y = -3x(x)$

c) $y = -2x(-6x)$

d) $y = 3x(2x - 1)$

When two monomials are multiplied:

→ first multiply the coefficients

→ second multiply the variables; note $x(x) = x^2$

Using the FOIL Rule to Multiply Two Binomials

The Foil Rule stands for:

Firsts

Outsides

Insides

Lasts

Example: Use the FOIL RULE to expand and simplify the following expressions:

a) $(x+2)(x+3)$

b) $(x+5)(x+2)$

c) $(x-7)(x+9)$

d) $3(x-2)(x+7)$

e) $(x-6)(x+6)$

f) $(x+5)^2$

Expanding Binomials – Practice

1. Expand the following expressions:

a) $(x + 3)(x + 8)$

b) $(x - 4)(x + 7)$

c) $(x - 3)(x - 9)$

d) $(2x + 1)(x - 3)$

e) $(x + 2)(3x + 5)$

f) $(2x - 1)(3x + 4)$

g) $2(x + 5)(x + 1)$

h) $3(x - 1)(x + 4)$

i) $-2(x - 9)(x - 2)$

j) $(x + 4)^2$

k) $(x - 3)^2$

l) $2(x + 5)^2$

2. Complete the table of values then graph the parabola: y

$$y = (x - 4)^2 - 3$$

x	y
1	
2	
3	
4	
5	
6	
7	

