

1.) How many roots does the function $y = x^2 - 6x + 9$ have?

1 ROOT

2.) What is the distance, in units, of the y-intercept of the linear function represented by the table and the function $g(x) = x^2 + 5x - 7$

31 units

x	y
-14	3
-12	6
-10	9
-8	12
-6	15

3.) What is the difference between the area and perimeter of a square with a side length of $4x + 2$?

area

$$(4x+2)(4x+2)$$

$$16x^2 + 16x + 4 - (16x + 8)$$

$$16x^2 - 4$$

perimeter

$$4(4x+2)$$

-4	18
-2	21
0	24

Graphing v. Factoring

Graphing:

The equation needs to be in the form:

$$y = ax^2 + bx + c$$

Graph the equation and identify the roots, aka the x-intercepts, or the zeroes.

Factoring:

The equation needs to be in the form:

$$ax^2 + bx + c = 0$$

Factor completely and then set each factor equal to 0. Solve each equation for x.

Main Ideas/Questions	Notes/Examples
SOLVING QUADRATICS By Factoring	In many cases, we can find the solutions (or roots, zeros, x-intercepts) of a quadratic equation by factoring, rather than graphing. Follow the steps below to find the solutions of the given equation by factoring.
	1 Set the quadratic equation equal to 0. Given: $y = x^2 + 3x - 10$
	2 Factor the left side.
	3 Set each factor equal to 0 and solve each factor for x .
	4 Write your answer using curly braces.

$a=1$
 $b=3$
 $c=-10$

$ac = -10$
 $\begin{array}{r|l} -1 & 10 \\ -2 & 5 \end{array}$

$x^2 + 3x - 10 = 0$
 $(x-2)(x+5) = 0$

$x-2=0$ $x+5=0$
 $\begin{array}{r} x-2=0 \\ +2+2 \\ \hline x=2 \end{array}$ $\begin{array}{r} x+5=0 \\ -5-5 \\ \hline x=-5 \end{array}$

$\{-5, 2\}$

1. $x^2 + 4x + 3 = 0$
 $a=1$ $b=4$ $c=3$
 $ac=3$
 $\begin{array}{r|l} 1 & 3 \\ & 3 \end{array}$

$(x+1)(x+3) = 0$
 $x+1=0$ $x+3=0$
 $\begin{array}{r} x+1=0 \\ -1-1 \\ \hline x=-1 \end{array}$ $\begin{array}{r} x+3=0 \\ -3-3 \\ \hline x=-3 \end{array}$

$\{-3, -1\}$

2. $x^2 + 11x + 24 = 0$
 $a=1$ $b=11$ $c=24$
 $ac=24$
 $\begin{array}{r|l} 1 & 24 \\ 2 & 12 \\ 3 & 8 \\ 4 & 6 \end{array}$

$(x+3)(x+8) = 0$
 $x+3=0$ $x+8=0$
 $\begin{array}{r} x+3=0 \\ -3-3 \\ \hline x=-3 \end{array}$ $\begin{array}{r} x+8=0 \\ -8-8 \\ \hline x=-8 \end{array}$

$\{-8, -3\}$

5. $x^2 - 10x + 21 = 0$

6. $x^2 - x - 20 = 0$

$9. \frac{x^2 - 8x}{x \cdot x} = 0$ $x(x-8) = 0$ $x = 0 \quad x - 8 = 0$	$10. \frac{3x^2 + 15x}{3x \cdot 3x} = 0$ $3x(x+5) = 0$ $3x = 0 \quad x + 5 = 0$
--	---

$\{0, 8\}$

$$\frac{+8 \quad +8}{x = 8}$$

$(0, 0)$ and $(8, 0)$

$x = 0$ and $x = 8$

$$\frac{3 \quad 3}{x = 0} \quad \frac{-5 \quad -5}{x = -5}$$

$\{-5, 0\}$

$13. x^2 - 64 = 0$ $(x+8)(x-8) = 0$ $x+8 = 0 \quad x-8 = 0$ $\frac{-8 \quad -8}{x = -8} \quad \frac{+8 \quad +8}{x = 8}$	$15. 4x^2 - 81 = 0$ $(2x+9)(2x-9) = 0$ $2x+9 = 0 \quad 2x-9 = 0$ $\frac{-9 \quad -9}{2x = -9} \quad \frac{+9 \quad +9}{2x = 9}$
--	---

$$x = -8$$

$\{-8, 8\}$

$$\frac{2x = -9}{2} \quad \frac{2x = 9}{2}$$

$$x = -4.5$$

$$\frac{2x = 9}{2} \quad \frac{2x = 9}{2}$$

$$x = 4.5$$

$\{-4.5, 4.5\}$

**EQUATIONS
NOT IN
Standard Form**

MOVE • FACTOR • SOLVE!

17. $x^2 + 4x = 21$

$$\frac{-21 \quad -21}{x^2 + 4x - 21 = 0}$$

18. $x^2 - 45 = 4x$

$$\frac{-4x \quad -4x}{x^2 - 4x - 45 = 0}$$

$$20.) \quad \begin{array}{r} x^2 - 10x + 49 = 4x + 1 \\ \quad -4x - 1 \quad \quad -4x - 1 \\ \hline x^2 - 14x + 48 = 0 \end{array}$$

21. $11x^2 = x^2 + 8x$

$$\frac{-x^2 - 8x \quad -x^2 - 8x}{10x^2 - 8x = 0}$$

22. $16x^2 = 9$