

6-3 Solving Quadratic Equations by Factoring

Alg 2

Remember Factoring???? ....It's BAAACK!

$x^2 + 5x + 6 = 0$   
 $(x+2)(x+3) = 0$   
 $x+2 = 0 \quad x+3 = 0$   
 $x = -2 \quad x = -3$   
 $\{ -2, -3 \}$

$x^2 - 7x + 12 = 0$   
 $(x-3)(x-4) = 0$   
 $x-3 = 0 \quad x-4 = 0$   
 $x = 3 \quad x = 4$   
 $\{ 3, 4 \}$

$x^2 = 49$   
 $\frac{-49 \quad -49}{x^2 - 49 = 0}$   
 $(x+7)(x-7) = 0$   
 $x+7 = 0 \quad x-7 = 0$   
 $x = -7 \quad x = 7$   
 $\{ 7, -7 \}$

$3x^2 + 5x + 2 = 0$   
 $(3x^2 + 3x)(x+2) = 0$   
 $3x(x+1) + 2(x+1) = 0$   
 $(3x+2)(x+1) = 0$   
 $3x+2 = 0 \quad x+1 = 0$   
 $\frac{-2 \quad -2}{3x = -2}$   
 $\frac{-1 \quad -1}{x = -1}$   
 $x = -\frac{2}{3}$   
 $\{ -\frac{2}{3}, -1 \}$

$x^2 + 6x + 5 = 0$   
 $\frac{x^2 + 6x + 5}{2, 3}$   
 $\{ -2, -3 \}$

$x^2 + 12x - 7 = 0$   
 $\frac{x^2 + 12x - 7}{-3, 4}$   
 $\{ 3, 4 \}$

$x^2 + 6x + 5 = 0$   
 $\frac{x^2 + 6x + 5}{3, 2}$   
 $\{ -\frac{2}{3}, -1 \}$

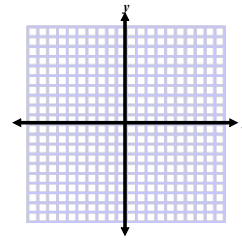
Example 1 - 2 ROOTS

What are the roots?  
What exactly are you finding?

Solve each equation by factoring

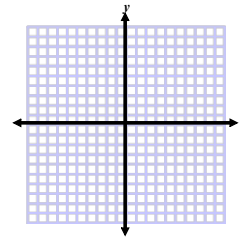
$$\begin{aligned}
 x^2 &= 6x \\
 -6x &-6x \\
 \hline
 x^2 - 6x &= 0 \\
 x(x-6) &= 0 \\
 x=0 & \quad x-6=0 \\
 & \quad \quad \quad +6 \quad +6 \\
 & \quad \quad \quad \hline
 & \quad \quad \quad x=6
 \end{aligned}$$

$\{0, 6\}$



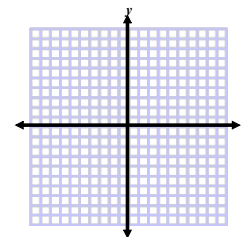
$$\begin{aligned}
 x^2 &= -4x \\
 +4x &+4x \\
 \hline
 x^2 + 4x &= 0 \\
 x(x+4) &= 0 \\
 x=0 & \quad x+4=0 \\
 & \quad \quad \quad -4 \quad -4 \\
 & \quad \quad \quad \hline
 & \quad \quad \quad x=-4
 \end{aligned}$$

$\{0, -4\}$

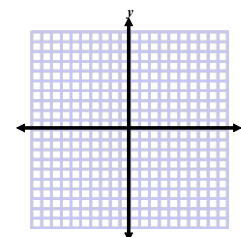


$$\begin{aligned}
 3x^2 &= 5x + 2 \\
 -5x &-2 \quad -5x - 2 \\
 \hline
 3x^2 - 5x - 2 &= 0 & \quad \begin{array}{r} x-6 \quad | \quad +5 \\ -6, 1 \end{array} \\
 (3x^2 - 6x) + (1x - 2) &= 0 \\
 3x(x-2) + 1(x-2) &= 0 \\
 (3x+1)(x-2) &= 0 \\
 3x+1=0 & \quad x-2=0 \\
 3x=-1 & \quad x=2 \\
 x=-\frac{1}{3} &
 \end{aligned}$$

$\{-\frac{1}{3}, 2\}$



$$2x^2 + 7x = 15$$



**Example 2 - DOUBLE ROOT**

$$x^2 - 6x = -9$$

+9   +9

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$$x^2 - 6x + 9 = 0$$

$$(x-3)(x-3) = 0$$

$$x-3=0 \quad x-3=0$$

$$x=3 \quad x=3$$

$$\begin{array}{r|l} x & 9 \\ \hline & + -6 \\ & -3, -3 \end{array}$$

$$\{3\}$$

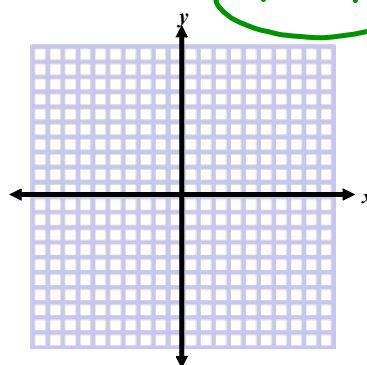
What are the roots?  
What exactly are you finding?

$$x^2 - 64 = 0$$

$$(x-8)(x+8) = 0$$

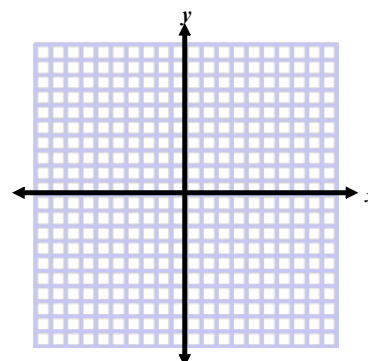
$$x-8=0 \quad x+8=0$$

$$x=8, -8$$



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$$x^2 - 16x + 64 = 0$$



**Example 4 - Write an Equation Given Roots**

Write an equation with  $\frac{1}{2}$  and  $-5$  as its roots.

Write the equation in  $ax^2 + bx + c = 0$ , where  $a, b, c$  are integers.



Write an equation with  $-4$  and  $7$  as its roots.

Write the equation in  $ax^2 + bx + c = 0$ , where  $a, b, c$  are integers.