

SOLVING QUADRATIC EQUATIONS BY FACTORING

Since the title of this section has the word **factoring** in it, see if you can at least get this first problem started!

$$x^2 - 12x + 35 = 0$$

$$\begin{aligned} (x-7)(x-5) &= 0 \\ \text{so, } x-7 &= 0 \quad \text{and} \quad x-5 = 0 \\ x &= 7 \quad \text{and} \quad x = 5 \end{aligned}$$

The process: 1) **factor** it! Don't forget about our good friend the GCF.
2) set each **factor** equal to zero.
3) solve each equation (can you find a short cut??)

Examples:

1) $3x^2 + 18x = 0$

$$\begin{aligned} 3x(x+6) &= 0 \\ 3x &= 0 \quad \text{and} \quad x+6 = 0 \\ x &= 0 \quad \text{and} \quad x = -6 \end{aligned}$$

2) $n^2 - 3n - 28 = 0$

$$\begin{aligned} (n-7)(n+4) &= 0 \\ \text{short cut: just switch signs} \\ n &= 7 \quad \text{and} \quad n = -4 \end{aligned}$$

3) $j^2 + 18j + 81 = 0$

$$\begin{aligned} (j+9)(j+9) &= 0 \\ \text{no need to write it twice} \\ j &= -9 \end{aligned}$$

Tougher ones:

4) $y^2 - 9 = -8y$

$$\begin{aligned} y^2 + 8y - 9 &= 0 \\ (y+9)(y-1) &= 0 \\ y &= -9 \quad \text{and} \quad y = 1 \end{aligned}$$

5) $5x^2 - 29x - 6 = 0$

$$\begin{aligned} (5x+1)(x-6) &= 0 \\ x &= -1/5 \quad \text{and} \quad x = 6 \end{aligned}$$

6) $8n^2 = 18$

$$\begin{aligned} 8n^2 - 18 &= 0 \\ 2(4n^2 - 9) &= 0 \\ 2(2n-3)(2n+3) &= 0 \\ n &= 3/2 \quad \text{and} \quad n = -3/2 \end{aligned}$$

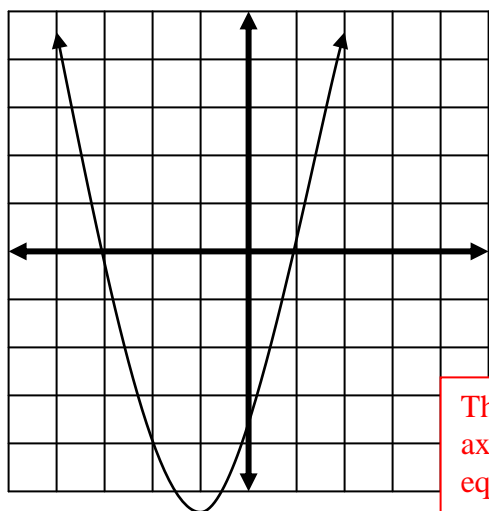
Homework: CP pg256-257 21-30, 33-42 (do not graph)

All pg 256-257 17-30, 33-36

Did you, or can you find a short cut for solving #6 after you have factored into () ()???

COINCIDENCES IN MATH

Short cut for #5,6. Make a fraction out of the numbers in the (), but still change the sign.



The graph crosses the x-axis @ the solutions to the equation.

Solve the following quadratic equation by factoring:

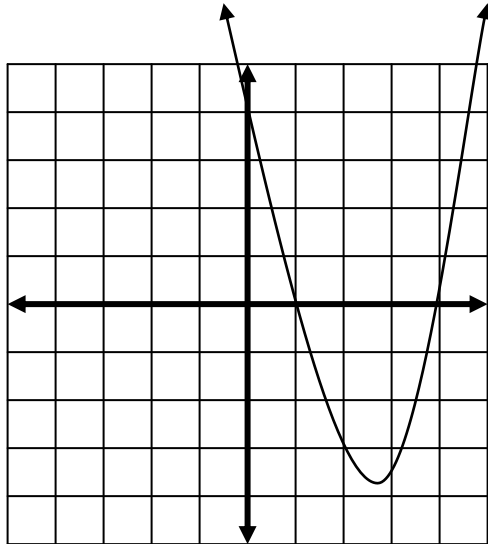
$$x^2 + 2x - 3 = 0$$

$$\begin{aligned} (x+3)(x-1) &= 0 \\ x &= -3 \quad \text{and} \quad x = 1 \end{aligned}$$

Look at the graph for the equation; $y = x^2 + 2x - 3$ on the grid given. What coincidence do you see?

Write a **quadratic** equation for the graph given.

Don't forget the word **equation** implies and equal sign is to be used.



Equation:

Solutions: $x = 1$ and $x = 4$
Therefore: $(x - 1)(x - 4) = 0$

Equation in standard form:

$(x - 1)(x - 4) = 0$
Now FOIL
 $x^2 - 4x - 1x + 4 = 0$
 $x^2 - 5x + 4 = 0$

How about without the graph!

Write a **quadratic** equation in standard form, if the solutions or **roots** are given.

1) 9 and -3

$(x - 9)(x + 3) = 0$
FOIL
 $x^2 + 3x - 9x - 27 = 0$
 $x^2 - 6x - 27 = 0$

2) 0 and 6

$x(x - 6) = 0$
DISTRIBUTE
 $x^2 - 6x = 0$

BONUS ROUND:

3) -5

There are always two answers to a quadratic equation, so you can assume the other solution was also -5.

$(x + 5)(x + 5) = 0$
 $x^2 + 5x + 5x + 25 = 0$
 $x^2 + 10x + 25 = 0$

4) $\frac{1}{4}$ and $-\frac{3}{2}$

Use the short cut in reverse.
 $(4x - 1)(2x + 3) = 0$
 $8x^2 + 12x - 2x - 3 = 0$
 $8x^2 + 10x - 3 = 0$