

TOC 66 Solving Quadratics

Zero Product Principle

If $A \cdot B = 0$, then $A = 0$ or $B = 0$

$$(x+6)(x-3) = 0$$

$$\begin{array}{r} x+6=0 \text{ or } x-3=0 \\ \xrightarrow{+6} \quad \xrightarrow{+3} \\ \hline -6 \quad \quad -3 \end{array}$$

$$\boxed{x = -6 \text{ or } x = 3}$$

$$\begin{array}{r} x^2 - 6x = 16 \\ -16 \quad -16 \\ \hline x^2 - 6x - 16 = 0 \end{array}$$

$$(x-8)(x+2) = 0$$

$$\begin{array}{r} x-8=0 \text{ or } x+2=0 \\ \xrightarrow{+8} \quad \xrightarrow{-2} \\ \hline 8 \quad \quad -2 \end{array}$$

$$\boxed{x = 8 \text{ or } x = -2}$$

Factoring a = 1

1. Rewrite the equation in standard form;
 $ax^2 + bx + c = 0$

2. Factor

3. Solve

Factoring a > 1

1. Rewrite the equation in standard form

$$2x^2 + 7x - 4 = 0$$

$$\begin{array}{r} \begin{array}{ccc} -8 & -1 & -8 \\ -1 & 8 & -2 & -4 \\ \hline & & -2 & 4 \end{array} \end{array}$$

$$(x-1)(x+4) = 0$$

$$(2x-1)(x+4) = 0$$

$$\begin{array}{r} 2x-1=0 \text{ or } x+4=0 \\ \xrightarrow{+1} \quad \xrightarrow{-4} \\ \hline 1 \quad \quad -4 \end{array}$$

$$\begin{array}{r} 2x=1 \\ \xrightarrow{\div 2} \\ \hline x = \frac{1}{2} \end{array}$$

$$\boxed{x = \frac{1}{2} \text{ or } x = -4}$$



$$2x^2 - 4x - 1 = 0$$

$$\begin{array}{r} \begin{array}{ccc} -2 & -1 & 2 \\ -2 & 1 & -2 \\ \hline & & 1 & -2 \end{array} \end{array}$$

$$x = \frac{4 \pm \sqrt{(-4)^2 - 4(2)(-1)}}{2(2)}$$

$$x = \frac{4 \pm \sqrt{16 + 8}}{4} = \frac{4 \pm \sqrt{24}}{4}$$

$$\frac{4 \pm 2\sqrt{6}}{4} = \frac{2 \pm \sqrt{6}}{2} = x$$

Quadratic Formula

When you are not able to factor use

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

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Example 1-(page 67): Solve $(x+7)(x-2)=0$

Example 2 (page 67): Solve $x^2 - 4x = 32$



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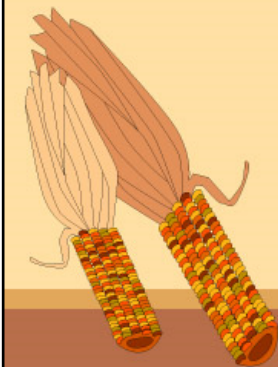
Example 3 (page 66) Solve

$$2x^2 + 15x - 8 = 0$$



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Example 4: Solve $2x^2 - 6x + 1 = 0$



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 #2-36 even

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Check your answers!

- 2) $x^2 + 9x + 14$
- 4) $x^2 + x - 2$
- 6) $2x^2 + x - 15$
- 8) $14x^2 - 71x + 36$
- 10) $(x + 3)(x + 5)$
- 12) $(x - 5)(x + 1)$
- 14) $(x - 9)(x - 5)$
- 16) $(x - 10)(x + 9)$
- 18) cannot be factored
- 20) $(x - 11)(x + 4)$
- 22) $(3x + 1)(x + 2)$
- 24) $(5x - 3)(x - 2)$
- 26) $(2x - 1)(x + 3)$
- 28) $(3x - 5)(x + 1)$
- 30) $(3x - 4)(2x - 3)$
- 32) $(8x + 1)(x + 4)$
- 34) $x = -11$ or $x = 5$
- 36) $x = -9$ or $x = 1/3$



$$2x^2 + 5x - 3$$

$$(x - 1)(x + 6)$$

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

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

$2 \cdot -3 = -6$
 $1 + -6 = -5$
 $-1 + 6 = 5$
 $2 + -3 = -1$
 $-2 + 3 = 1$

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<p>If $A \cdot B = 0$, then $A = 0$ or $B = 0$.</p>	<p>$(x+6)(x-3) = 0$ $x+6=0$ or $x-3=0$ $-6-6$ $+3+3$ $x=-6$ or $x=3$</p>	<p>$x^2 - 6x = 16$ $-16 -16$ $x^2 - 6x - 16 = 0$ $(x+2)(x-8) = 0$ $x+2=0$ or $x-8=0$ $-2-2$ $+8+8$ $x=-2$ or $x=8$</p>	<p>① Rewrite the equation in standard form; $x^2 + bx + c = 0$ ② Factor ③ Solve</p>
<p>① Rewrite the equation in standard form; $ax^2 + bx + c = 0$ ② Factor ③ Solve</p>	<p>$2x^2 + 7x - 4 = 0$ $2 \cdot -4 = -8$ $(x-1)(x+8) = 0$ $\frac{x-1}{2} \cdot \frac{x+8}{2} = 0$ $(2x-1)(x+4) = 0$ $(2x-1)(x+4) = 0$</p>	<p>$2x^2 - 4x - 1 = 0$ $a \quad b \quad c$ $x = \frac{4 \pm \sqrt{(-4)^2 - 4(2)(-1)}}{2(2)}$ $x = \frac{4 \pm \sqrt{16 + 8}}{4}$</p>	<p>$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ use when you cannot factor</p>

$\frac{2x-1=0}{x-1+1} \quad x+4=0 \quad x = \frac{4 \pm \sqrt{24}}{4}$
 $\frac{2x=1}{2} \quad \frac{x=-4}{x=-4} \quad x = \frac{4 \pm 2\sqrt{6}}{4}$
 $x = \frac{1}{2}$

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Example 4 (page 53): Solve

$$2x^2 - 6x + 1 = 0$$


$a \quad b \quad c$

$$x = \frac{6 \pm \sqrt{(-6)^2 - 4(2)(1)}}{2(2)}$$

$$x = \frac{6 \pm \sqrt{36 - 8}}{4}$$

$$x = \frac{6 \pm \sqrt{28}}{4}$$

$$x = \frac{6 \pm 2\sqrt{7}}{4}$$



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38-72 even

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