

Factor:

$$\textcircled{1} x^2 - 2x - 3$$

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

$$\textcircled{2} 2x^2 - x - 15$$

$$2x^2 - 6x + 5x - 15$$
$$2x(x-3) + 5(x-3)$$

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

$$\begin{array}{r} -30 \\ \swarrow \searrow \\ -6 \quad 5 \\ -6+5=-1 \\ -6 \cdot 5 = -30 \end{array}$$

$$\textcircled{3} 36x^2 - 25$$

$$(6x-5)(6x+5)$$

Diff. of Sq.

11-10 Solving Quad Eqns by Factoring & by Taking Square Roots

Ex. Solve by factoring

$$\begin{array}{r} x^2 - 2x = 3 \\ -3 \quad -3 \\ \hline \end{array}$$

↓ 1st
set = 0

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

$$(x-3)(x+1) = 0$$

2nd Factor

3rd set
each factor
= 0.

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

$x=3$

$$\begin{array}{r} x+1=0 \\ -1 \quad -1 \\ \hline \end{array}$$

$x=-1$

4th solve

Ex. Solve by factoring

$$\begin{array}{r} x^2 - 10 = -3x \\ + 3x + 3x \end{array}$$

$$x^2 + 3x - 10 = 0$$

$$(x+5)(x-2) = 0$$

$$x+5=0$$

$$x = -5$$

$$x-2=0$$

$$x = 2$$

Ex. Solve by factoring

$$5x^2 = 80 + 30x$$



$$\underline{5x^2 - 30x - 80 = 0}$$

5

$$x^2 - 6x - 16 = 0$$

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

$$x-8=0$$

$$x=8$$

$$x+2=0$$

$$x=-2$$

Ex. Solve by factoring

$$\begin{array}{r} x^2 - 20x + 64 = -5x + 8 \\ +5x \quad -8 \quad +5x - 8 \\ \hline \end{array}$$

$$x^2 - 15x + 56 = 0$$

$$(x-8)(x-7) = 0$$

$$\begin{array}{l} x-8=0 \\ \textcircled{x=8} \end{array}$$

$$\begin{array}{l} x-7=0 \\ \textcircled{x=7} \end{array}$$

$$\textcircled{1} \quad x^2 + 6 = 5x$$

$$x^2 - 5x + 6 = 0$$

$$(x-2)(x-3) = 0$$

$$x-2=0$$
$$\textcircled{x=2}$$

$$x-3=0$$
$$\textcircled{x=3}$$

Solving by Taking Square Roots:

$$\textcircled{1} \quad \sqrt{x^2} = \sqrt{25}$$

$$\textcircled{x=5, -5}$$

$$\textcircled{2} \quad \frac{2x^2}{2} = \frac{98}{2}$$

$$\sqrt{x^2} = \sqrt{49}$$

$$\textcircled{x=7, -7}$$

Two Answers!

★ Get squared part by itself! ★

③

$$\begin{array}{r} 5x^2 - 3 = 42 \\ +3 \quad +3 \\ \hline \end{array}$$

$$\frac{5x^2}{5} = \frac{45}{5}$$

$$\sqrt{x^2} = \sqrt{9}$$

$$x = 3, -3$$

④

$$\begin{array}{r} 3 - 2x^2 = -17 \\ -3 \quad -3 \\ \hline \end{array}$$

$$\frac{-2x^2}{-2} = \frac{-20}{-2}$$

$$\sqrt{x^2} = \sqrt{10}$$

$$x = 3.162, -3.162$$

Factor:

$$\textcircled{1} x^2 - 2x - 3$$

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

$$\textcircled{2} 2x^2 + 9x - 5$$

-10
10+-1

$$2x^2 + 10x - 1x - 5$$
$$2x(x+5) - 1(x+5)$$
$$(x+5)(2x-1)$$

$$\textcircled{3} 9x^2 - 25$$

$$(3x+5)(3x-5)$$

11-10 How do I solve quadratic equations by factoring?

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

$$(x-3)(x+1) = 0$$

$$x-3=0$$
$$x=3$$

$$x+1=0$$
$$x=-1$$

1st make one side 0
2nd factor
3rd set factors = to 0.
4th solve

Ex. Solve by factoring

$$2x^2 - 9x = 5$$

$$2x^2 - 9x - 5 = 0$$

$$2x^2 - 10x + 1x - 5 = 0$$

$$2x(x-5) + 1(x-5) = 0$$

$$(x-5)(2x+1) = 0$$

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

$$\begin{array}{r} 2x+1=0 \\ -1 \quad -1 \\ \hline 2x=-1 \\ x=-\frac{1}{2} \end{array}$$

Ex. Solve by factoring.

$$\begin{array}{r} 3x^2+14x-144=8x \\ -8x \qquad -8x \\ \hline \end{array}$$

$$\begin{array}{r} 3x^2+6x-144=0 \\ \hline 3 \qquad 3 \end{array}$$

$$x^2+2x-48=0$$

$$(x+8)(x-6)=0$$

$$x+8=0$$

$$x=-8$$

$$x-6=0$$

$$x=6$$

Solving by Taking Square Roots

Ex. $\sqrt{x^2} = \sqrt{9}$

$x = 3, -3$

Isolate the squared term! 1st!

Ex. $\frac{3x^2}{3} = \frac{75}{3}$

$\sqrt{x^2} = \sqrt{25}$

$x = 5, -5$

Ex. $1 - 5x^2 = -27$

$-5x^2 = -28$
 $\frac{-5x^2}{-5} = \frac{-28}{-5}$

$$\sqrt{x^2} = \sqrt{5.6}$$

$$x = \pm 2.366$$