Solve the quadratic equation by factoring

\[ 8x^2 + 2x = 0 \]
\[ 2x(4x + 1) = 0 \]
\[ 2x = 0 \text{ or } 4x + 1 = 0 \]
\[ x = 0 \text{ or } x = -\frac{1}{4} \]

\[ 2x^2 - 3x - 1 = 0 \]
\[ (2x - 1)(x - 1) = 0 \]
\[ 2x - 1 = 0 \text{ or } x - 1 = 0 \]
\[ x = \frac{1}{2} \text{ or } x = 1 \]

Solve the quadratic equation by the square root property.

\[ 4x^2 = 100 \]
\[ x^2 = 25 \]
\[ x = \pm 5 \]
\[ 2 \text{ real rational} \]

\[ 3(x + 2)^2 = 30 \]
\[ \sqrt{(x + 2)^2} = \sqrt{10} \]
\[ x + 2 = \pm \sqrt{10} \]
\[ x = -2 \pm \sqrt{10} \]
\[ 2 \text{ real irrational} \]

\[ (3x + 2)^2 = 361 \]
\[ \sqrt{(3x + 2)^2} = \pm \sqrt{361} \]
\[ 3x + 2 = \pm 19 \]
\[ 3x + 2 = 19 \text{ or } 3x + 2 = -19 \]
\[ x = 7 \text{ or } x = -7 \]
\[ 2 \text{ real rational} \]
Solve the quadratic equation by using the quadratic formula.

\[ 2x^2 - 6x = -1 \]

\[ 2x^2 - 6x + 1 = 0 \]

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

\[ 6 \pm \sqrt{(-6)^2 - 4(2)(1)} \]

\[ 2(2) \]

\[ 6 \pm \sqrt{36 - 8} \]

\[ 6 \pm \sqrt{28} \Rightarrow 6 \pm \sqrt{4 \cdot 7} \]

\[ 6 \pm 2\sqrt{7} \Rightarrow 3 \pm \sqrt{7} \]

What the discriminant tells you about the solutions to a quadratic equation

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

**A**

- \( D > 0 \)
- \( x_1 \) \quad \( x_2 \)
- \( -3 \pm \sqrt{5} \) \quad \( 2 \)
- 2 real sol.

**B**

- \( D = 0 \)
- \( x_1 = x_2 \)
- \( -3 \pm \sqrt{0} \) \quad \( 2 \)
- 1 real sol.

**C**

- \( D < 0 \)
- \( x_1 = x_2 \)
- \( -3 \pm \sqrt{-5} \) \quad \( 2 \)
- No real sol.
Using the discriminant.

Compute the discriminant. What does it indicate about the number and type of solutions? Can it be factored?

\[ x^2 - 5x + 7 = 0 \]
\[ (-5)^2 - 4(1)(7) = 25 - 28 = -3 \]
No real sol.
No x-ints.

\[ 9x^2 - 30x + 25 = 0 \]
\[ (-30)^2 - 4(9)(25) = 900 - 900 = 0 \]
1 real sol.
1 x-int.

\[ 3x^2 + 5x = 8 \]
\[ (5)^2 - 4(3)(-8) = 25 + 96 = 121 \]
2 real sol.

\[ 3x^2 + 5x - 8 = 0 \]
\[ (5)^2 - 4(3)(-8) = 25 + 96 = 121 \]
2 x-ints (rational)

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**Algebraic methods for solving quadratic equations**

- Factoring
- Square Root Property
- Quadratic Formula
- (Completing the Square)
Solve a Radical Equation.

1. If necessary, arrange terms so that one radical is isolated on one side of the equation.
2. Raise both sides of the equation to the power to eliminate the root.
3. Solve the resulting equation. If this equation still contains radicals, repeat steps 1 and 2.
4. Check all proposed solutions in the original equation.

\[ \sqrt{2x - 1} + 2 = x \]
\[ \sqrt{2x - 1} = x - 2 \]
\[ \left( \sqrt{2x - 1} \right)^2 = (x - 2)^2 \]
\[ 2x - 1 = x^2 - 4x + 4 \]
\[ 0 = x^2 - 6x + 5 \]

\[ 0 = (x - 5)(x - 1) \]

\[ x = 5 \quad x = 1 \]

Check your answer:

Homework

page 98

55-59 odd, 63, 65,
75-79 odd, 87-89,
95-101 odd, 111-117 odd,
121, 131, 135, 139, 140, 141, 143