

## SOLVING QUADRATIC EQUATIONS

Solve  $(x - 1)^2 = x^2$  by three different methods:

By square root method:

$$x-1 = x \text{ or } x-1 = -x$$

$$x = 0.5$$

---

By first expanding the left side (of the equation):

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

$$2x = 1$$

$$x = 0.5$$

---

By factoring a difference of squares

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

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

$$2x = 1$$

$$x = 0.5$$

Solve: \*\* Use the most efficient method.

\*\*Give all solutions in exact, simplified form.

1.  $3x^2 + 10x + 8 = 0$

$$(3x+4)(x+2) = 0$$

$$3x+4 = 0 \text{ or } x+2 = 0$$

$$x = -\frac{4}{3} \text{ or } -2$$

2.  $5x^2 = 20x$

$$x = 4 \text{ or } 0$$

3.  $(x-6)^2 - 8x = 0$

$$x^2 - 12x + 36 - 8x = 0$$

$$x^2 - 20x + 36 = 0$$

$$(x-2)(x-18) = 0$$

$$x = 2 \text{ or } 18$$

4.  $\frac{x^2}{3} + \frac{x}{5} = 1$

$$5x^2 + 3x - 15 = 0$$

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

$$\left(x + \frac{3}{10}\right)^2 = \frac{309}{100}$$

$$x + \frac{3}{10} = \pm \frac{\sqrt{309}}{10}$$

$$x = \frac{\sqrt{309}-3}{10} \text{ or } -\frac{\sqrt{309}+3}{10}$$

5.  $3 + 4(x+3)^2 = 35$

$$4(x+3)^2 = 32$$

$$(x+3)^2 = 8$$

$$x + 3 = \pm 2\sqrt{2}$$

$$x = 2\sqrt{2} - 3 \text{ or } -2\sqrt{2} - 3$$

6.  $3x^2 - 8\sqrt{2}x - 6 = 0$

$$x = \frac{8\sqrt{2} \pm \sqrt{128+72}}{6}$$

$$x = \frac{8\sqrt{2} \pm 10\sqrt{2}}{6}$$

$$x_1 = \frac{18\sqrt{2}}{6} = 3\sqrt{2}$$

$$x_2 = -\frac{\sqrt{2}}{3}$$