

### Completing the Square and the Quadratic Formula

Fill in the blank.

$$1. x^2 + 6x + \underline{9} = (x + \underline{3})^2$$

$$\frac{6}{2} = 3$$

$$2. x^2 + 3x + \underline{9/4} = (x + \underline{3/2})^2$$

$$\frac{3}{2}$$

$$2. x^2 - 10x + \underline{25} = (x - \underline{5})^2$$

$$\frac{-10}{2} = -5$$

$$4. x^2 - 9x + \underline{81/4} = (x - \underline{9/2})^2$$

$$\frac{-9}{2}$$

Solve by completing the square.

$$5. x^2 - 10x = -10$$

$$\frac{-10}{2} = (-5)^2 = 25$$

$$x^2 - 10x + 25 = -10 + 25$$

$$\sqrt{(x-5)^2} = \sqrt{15}$$

$$x-5 = \pm\sqrt{15}$$

$$\boxed{x = 5 \pm \sqrt{15}}$$

Solve by quadratic formula.

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

$$x = \frac{2 \pm \sqrt{4 - 4(2)(7)}}{2(2)} = \frac{2 \pm \sqrt{4 - 56}}{4} = \frac{2 \pm \sqrt{-52}}{4}$$

$$\boxed{\frac{1 \pm i\sqrt{13}}{2}}$$

$$= \frac{2 \pm 2i\sqrt{13}}{4}$$

$$6. x^2 - 4x - 21 = 0$$

$$x^2 - 4x + 4 = 21 + 4$$

$$\frac{-4}{2} = (-2)^2 = 4$$

$$\sqrt{(x-2)^2} = \sqrt{25}$$

$$x-2 = \pm 5$$

$$x = 2 \pm 5$$

$$2+5 = \boxed{7}$$

$$2-5 = \boxed{-3}$$

$$8. 2x^2 - 7x + 3 = 0$$

$$x = \frac{7 \pm \sqrt{49 - 4(2)(3)}}{2(2)}$$

$$x = \frac{7 \pm \sqrt{49 - 24}}{4} = \frac{7 \pm \sqrt{25}}{4} = \frac{7 \pm 5}{4}$$

$$= \frac{7+5}{4} = \frac{12}{4} = \boxed{3}$$

$$= \frac{7-5}{4} = \frac{2}{4} = \boxed{\frac{1}{2}}$$

Find the value of the discriminant and state the number of solutions.

$$9. x^2 + 5x + 8 = 0$$

$$b^2 - 4ac$$

$$(5)^2 - 4(1)(8)$$

$$25 - 32$$

$$\boxed{-7}$$

0 Real Sols.

$$10. 2x^2 - 2x + 7 = 0$$

$$(-2)^2 - 4(2)(7)$$

$$4 - 56$$

$$\boxed{-52}$$

0 Real Sols.