

$$6. 9^{k-5} + 4 = 27$$

$$12. 2^{k+8} = 10^{k-4}$$

6.3 SOLVING LOGARITHMIC EQUATIONS

Solve each equation.

$$1. \log_3 x = 4$$

$$3^4 = x$$
$$\boxed{81 = x}$$

$$2. \log_4(2x + 10) = 3$$

$$4^3 = 2x + 10$$
$$64 = 2x + 10$$
$$2x = 54$$
$$\boxed{x = 27}$$

$$3. \log_x 512 = 3$$

$$x^3 = 512$$
$$x = \sqrt[3]{512} = \boxed{8}$$

$$4. \log_6(4x + 9) = \log_6(2x + 19)$$

$$4x + 9 = 2x + 19$$
$$2x = 10$$
$$\boxed{x = 5}$$

$$5. \log(3x + 4) = 2$$

$$10^2 = 3x + 4$$
$$3x = 96$$
$$\boxed{x = 32}$$

$$6. \ln(2x + 4) = 3$$

$$e^3 = 2x + 4$$
$$\boxed{x = \frac{e^3 - 4}{2} = 8.0428}$$

$$7. \log_3(3x - 6) = \log_3(2x + 1)$$

$$3x - 6 = 2x + 1$$
$$\boxed{x = 7}$$

$$8. \log_7(3x + 7) = 4$$

$$7^4 = 3x + 7$$
$$2401 = 3x + 7$$
$$\boxed{x = 798}$$