1. Find the slope of the line for each problem.
   a. \(2x - 6y = 9\)
   b. Parallel to \(2x - y = 8\)
   c. Perpendicular to \(y = \frac{3}{4}x - 9\)

2. Find an equation of a line with the given characteristics.
   a. Passing through the points \((3, -1)\) and \((6, -7)\)
   b. With a slope of 0 and passing through the point \((5, -2)\)

3. A bicycle store finds that if it sells \(x\) racing bicycles per month, its costs will be \(C(x) = 180x + 60,000\) dollars and its revenue will be \(R(x) = -3x^2 + 1800x\) dollars.
   a. Find the store’s break-even points.
   b. Find the number of bicycles that will maximize profit and the maximum profit.

4. If a tennis ball is thrown upward with an initial velocity of 13 ft/second, then its height after \(t\) seconds is given by \(h(t) = 104t - 13t^2\) feet.
   a. Find the maximum height attained by the tennis ball.
   b. Find the number of seconds it takes the tennis ball to hit the ground.

5. Find the vertical and horizontal asymptotes for each of the following functions:
   a. \(f(x) = \frac{2x + 9}{5x - 8}\)
   b. \(f(x) = \frac{5x - 7}{2x^2 + 10x - 72}\)
   c. \(f(x) = \frac{5x^2}{x^2 + 6x}\)

6. Find the value of \$5000\) invested for 10 years at 8% interest if the money is
   a. Compounded annually
   b. Compounded monthly
   c. Compounded continuously

7. The turtle population in Allen Brook pond is growing exponentially and can be described by the function \(P(t) = 8e^{0.4t}\) turtles, after \(t\) years.
   a. What is the turtle population after 5 years?
   b. When will the turtle population be 100 turtles?

8. Rosie puts \$10,000\) in an account to save money for a down payment towards a house that she hopes to buy in 10 years. Her dream house is expensive and she hopes to have a good down payment of \$30,000\) by then. Find the interest rate that is necessary if the interest is compounded continuously.

9. 500 grams of iodine XY is decaying exponentially. After 3 days 386 grams of iodine XY is left.
   a. Find the “growth” constant \(k\) for iodine XY.
   b. Use your answer from part a to find the half-life of iodine XY.
10. Find the domain of the function \( f(x) = \sqrt{2x^2 - 7x - 4} \)

11. Solve for \( x \).
   
   a. \( (\frac{1}{4})^{3-x} = 32^x \)
   b. \( (e^x)^{x+6} = \frac{1}{e^8} \)
   c. \( e^{x-1} = 6 \)
   d. \( \log_4 x - \log_4(x + 3) = -1 \)

12. Let \( f(x) = x^2 - 3x \) and evaluate each of the following:
   
   a. \( f(-5) \)
   b. \( f(a + 2) \)
   c. \( f(x + h) \)
   d. \( f(x + h) - f(x) \)

KEY

1. a. slope = 1/3 b. slope = 2 c. slope = -4/3
2. a. \( y = -2x + 5 \) b. \( y = -2 \)
3. a. Break-even at 40 or 500 bicycles sold
   b. Max profit of \( \$158,700 \) when 270 bikes are made and sold
4. a. The maximum height will be 208 feet (when \( t = 4 \) seconds) b. 8 seconds to hit the ground
5. a. \( VA \ x = 8/5 \) HA \( y = 2/5 \) b. \( VA \ x = -9, x = 4 \) HA \( y = 0 \) c. \( VA \ x = 0, x = -6 \) HA \( y = 5 \)
6. a. \( \$10,794.62 \) b. \( \$11,098.20 \) c. \( \$11,127.70 \)
7. a. 59.11 turtles b. \( \frac{\ln(12.5)}{.4} = 6.3 \) years
8. 10.99%
9. a. \( k = \frac{\ln(.772)}{3} \approx -0.0862569097 \approx -0.08626 \) b. \( t = \frac{\ln(.5)}{-.08626} = 8.0356 \) days
10. \( (-\infty, -\frac{1}{2}] \cup [4, \infty) \)
11. a. \( x = -2 \) b. \( x = -1, -5 \) c. \( x = \ln 6 + 1 \) d. \( x = 1 \)
12. a. 40 b. \( a^2 + a - 2 \) c. \( x^2 + 2xh + h^2 - 3x - 3h \) d. \( 2xh + h^2 - 3h \)