1. In the following find the slope of the line passing through each pair of points or state that the slope is undefined. Then indicate whether the line through the points rises, falls, is horizontal, or is vertical.

   (a) (2, 1) and (3, 4)  
   (b) (4, −1) and (3, −1)  
   (c) (6, −4) and (4, −2)  
   (d) (3, −4) and (3, 5)

2. Use the given conditions to write an equation for each line in slope/y-intercept form.

   (a) Slope = 2, passing through (5, 7).

   (b) Slope = −5, passing through (−4, −2).

   (c) Slope = \(-\frac{3}{5}\), passing through (10, −4).

   (d) Passing through (2, 4) with x-intercept = −2.
3. Give the slope and $y$-intercept of each line whose equation is given. Then graph the linear function on the chart provided below (you can use different colors).

(a) $y = -\frac{2}{5}x + 6$

(b) $3x + 12 = 0$

(c) $6x - 2y - 12 = 0$

(d) $y = -2$
4. Use the given conditions to write an equation for each line in
   (i) point-slope form;
   (ii) slope/y-intercept form;
   (iii) general form.
   (a) Passing through \((-2, -7)\) and parallel to the line whose equation is \(y = -5x + 4\).

   (b) Passing through \((-4, 2)\) and perpendicular to the line whose equation is \(y = \frac{1}{3}x + 7\).

   (c) Passing through \((-1, 3)\) and parallel to the line whose equation is \(3x - 2y - 5 = 0\).

   (d) Passing through \((5, -9)\) and perpendicular to the line whose equation is \(x + 7y - 12 = 0\).
5. Find the average rate of change of the function from \( x_1 \) to \( x_2 \).

(a) \( f(x) = 6x \) from \( x_1 = 0 \) to \( x_2 = 4 \)

(b) \( f(x) = x^2 - 2x \) from \( x_1 = 3 \) to \( x_2 = 6 \)

(c) \( f(x) = \sqrt{x} \) from \( x_1 = 9 \) to \( x_2 = 16 \)

(d) \( f(x) = \frac{1}{x} \) from \( x_1 = 1 \) to \( x_2 = 5 \)

(e) \( f(x) = |x| \) from \( x_1 = -3 \) to \( x_2 = 3 \)

(f) \( f(x) = \begin{cases} 
2x + 1 & \text{if } x \leq 0 \\
x^2 + 1 & \text{if } x > 0 
\end{cases} \) from \( x_1 = -1 \) to \( x_2 = 2 \)

(g) \( f(x) = 5x \) from \( x_1 = 2a \) to \( x_2 = 2b \)
6. Solve the following problems.

(a) In 2000, 47% of Americans regularly used newspapers for getting news and this has decreased at an average rate of approximately 1.2% per year since then.
   
   (i) Find a linear function in slope/y-intercept form that models the percentage of Americans, \( P(x) \), who regularly used the news outlet \( x \) years after 2000.

   (ii) Determine the percentage of Americans who used newspapers in 2010.

(b) The average systolic blood pressure for a 26-year-old is 113 and for 40-year-old is 120.

   (i) Determine a linear function in slope/y-intercept form that models the systolic blood pressure \( P(x) \) for a \( x \)-year-old individual.

   (ii) What does the slope represent in terms of blood pressure and age?

(c) The slope of the sides of one of the ancient pyramids in Egypt is \( \frac{13}{10} \). If the base of the pyramid is 750 feet, how tall is the pyramid?
7. Use the graph of \( y = f(x) \) to graph each function (you can use different colors and both charts).

(a) \( a(x) = f(x) - 1 \)  \hspace{2cm} (d) \( d(x) = -f(x) \)
(b) \( b(x) = f(x - 1) \)  \hspace{2cm} (e) \( e(x) = -f(-x) \)
(c) \( c(x) = f(-x) \)  \hspace{2cm} (f) \( f(x) = f(x + 1) - 2 \)
8. Graph the standard quadratic function \( y = x^2 \), then use transformations of this graph to graph \( g(x) = 2(x + 5)^2 - 5 \).

9. Graph the standard square root function \( y = \sqrt{x} \), then use transformations of this graph to graph \( g(x) = -\sqrt{x - 1} \).
10. Graph the standard absolute value function $y = |x|$, then use transformations of this graph to graph $g(x) = |x + 3| - 2$.

11. Graph the standard cubic function $y = x^3$, then use transformations of this graph to graph $g(x) = \frac{1}{2}(x - 2)^3$. 
12. Find the domain of each function. Give your answer in interval notation.

(a) \( y = \frac{2}{x + 5} \)

(b) \( y = \sqrt{x + 2} \)

(c) \( y = \frac{1}{\sqrt{x - 1}} \)

(d) \( y = \frac{2x + 7}{x^2 + x - 12} \)

(e) \( y = \frac{\sqrt{x - 1}}{x - 5} \)

(f) \( y = \sqrt{x + 2} + \sqrt{x - 1} \)
13. Find \( f + g, f - g, f \cdot g, \frac{f}{g} \).

(a) \( f(x) = 2x + 1 \) and \( g(x) = 3x^2 \)

(b) \( f(x) = \sqrt{x} \) and \( g(x) = \frac{1}{x} \)

(c) \( f(x) = \frac{3x + 1}{x^2 - 9} \) and \( g(x) = \frac{x + 4}{x^2 - 9} \)

14. Find \((f \circ g)(x)\), \((g \circ f)(x)\), and \((f \circ g)(1)\). Simplify completely.

(a) \( f(x) = 3x \) and \( g(x) = 2x - 1 \)

(b) \( f(x) = x^2 - 1 \) and \( g(x) = x + 1 \)

(c) \( f(x) = \frac{1}{x + 1} \) and \( g(x) = \sqrt{x} \)