1. Find the average rate of change of the following functions in the given range

(a) \( f(x) = x^2 + 3x \) from \(-2\) to \(0\)

(b) \( g(x) = \begin{cases} x^2 & x < 0 \\ x^3 & x \geq 0 \end{cases} \) from \(-1\) to \(3\)

(c) the function below from \(-1\) to \(1\)

![Graph of the function](image)

2. Define the function from problem 1c on the interval \([-2, 3]\).

3. Determine whether the functions are even, odd, or neither.

(a) \( f(x) = x^3 + 4x \)

(b) \( g(t) = 3t^4 + 1 \)

(c) \( h(x) = 3x^5 - x + 1 \)

4. Let \( f(x) = 3x - 2 \). Let \( A \) be the point \((4, 0)\)

(a) Give the equation of a line parallel to \( f \).

(b) Give the equation of a line parallel to \( f \) that goes through the point \( A \).

(c) Give the equation of a line perpendicular to \( f \) that goes through the point \( A \).

(d) Find the equation of a line perpendicular to the line \( x = 2 \) that goes through the point \((-1, 3)\).

(e) Find the equation of a line that goes through the points \( A \) and \((-5, -1)\).

5. If the lines \( 4y + 2x = -5 \) and \( 3y + ax = -2 \) are perpendicular, what is the value of \( a \)?

6. After purchasing an autographed baseball card for $85, its value increases by $1.50 per year.

(a) What is the card’s value 7 years after purchase?
(b) How many years will it take for this card’s value to reach $100? 

7. The graph of $f$ is given at right

(a) Find the domain of $f$. 
(b) Find the range of $f$. 
(c) For which $x$ is $f(x) < 5$? 
(d) For which $x$ is $f(x) = 6$? 

8. The graph of $g$ is given at right 

(a) Find the domain of $g$. 
(b) Find the range of $g$. 
(c) For which $x$ is $g(x) > 0$? 
(d) For which $x$ is $g(x) = -2$? 

9. Given that $f(x) = \sqrt{x - 4}$ and $g(x) = \frac{2}{3x+2}$ 

(a) Find $(f \circ g)(x)$ 
(b) Find $(g \circ f)(x)$ 
(c) Find $(g \circ g)(x)$ 
(d) Find $(f + g)(5)$ 

10. Given $h(x) = (\sqrt{x} + 1)^2 - 3$, identify two functions $f$ and $g$ so that $(f \circ g)(x) = h(x)$, then check your answer. 

11. Carefully graph the following functions, giving the domain and range in interval notation. 

(a) $g(x) = |2x + 3|$ 
(b) $g(x) = -2|x| + 1$ 
(c) $h(x) = -3x^2 - 1$ 
(d) $h(x) = 3(x - 1)^2$ 
(e) $k(x) = -\sqrt{x + 4}$ 
(f) $k(x) = \sqrt{2 - x}$ 
(g) $\ell(x) = 5\sqrt{x - 3}$