1. Find the equation of the line that is perpendicular to \(2x + 3y = 12\) and has the same y-intercept.

\[6\]

2. Write the equation of the line that passes through the given points.

\[3\]

a) \((3,-1)\) \((-4,-1)\)

\[2. \text{ a)} \quad \]

b) \((2,4)\) \((4,-4)\)

\[2. \text{ b)} \quad \]

c) \((2,-1)\) \((2,-6)\)

\[2. \text{ c)} \quad \]

3. Find a mathematical expression to model the following:

\[8\]

\(z\) varies directly as the square of \(x\) and inversely as \(y\).
If \( z = \frac{3}{2} \) when \( x = 3 \) and \( y = 4 \), what is \( k \)?

\[ k = \frac{3}{2} \]

4. Let \( f(x) = 4 - 2x^2 \); \( g(x) = 2 - x \); \( h(x) = \begin{cases} 3 - x^2, & x \geq 0 \\ 3 + 2x, & x < 0 \end{cases} \). Calculate and simplify the following. Show intermediate steps.

(4) a) \((f \circ g)(2.3)\)

a) \((f \circ g)(2.3) = 3.91\)

(4) b) \(h(3) - h(-3)\)

b) \(h(3) - h(-3) = 12\)

(4) c) \(\frac{f(x + 2) - f(x)}{2}\)

c) \(\frac{f(x + 2) - f(x)}{2} = -x^2 + 2\)

(4) d) \(\left(\frac{g}{h}\right)(-1)\)

d) \(\left(\frac{g}{h}\right)(-1) = 2\)

(4) e) \((g \circ h)(-1)\)

e) \((g \circ h)(-1) = 5\)

5. Find the domain of \( f(x) = \frac{\sqrt{2x + 3}}{x^2 - 5x} \).

(a) \(x \geq -\frac{3}{2} \) and \( x \neq 0 \)

6. Is the given function even or odd?

(3) a) \( f(x) = -x^4 + 2x^2 - 1 \)

a) \( f(x) \) is odd.
6. a) ___________________ 

(3) b) \( f(x) = 2x^3 + 3x^2 \)

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

b) ___________________

c) ___________________
7. Over which interval(s) is the function increasing?  
\[ f(x) = 2x^3 + 3x^2 - 12x \]

8. Use the graph of \( y = x^3 \) to write an equation for the function \( y = f(x) \) as graphed.

9. Given \( f(x) = \sqrt{2x - 1} \), state the domain of \( f(x) \). Find \( f^{-1}(x) \).

10. Let \( f(x) = 3 - x \) and \( g(x) = x^3 \). Find \( (g^{-1} \circ f^{-1})(-5) \).
11. Given $y = -2x^2 - 4x - 5$.

(8) Write in standard form for a parabola and determine the maximum or minimum value.

12. a) Find the quadratic function that has a maximum point at (-1,2) and passes through (0,1).

(5)

b) Find the quadratic function whose graph opens upward and has x-intercepts at (-4,0) and (1,0).

(5)

**Bonus:** Find a relationship between $x$ and $y$ so that $(x, y)$ is equidistant from the two points (4,-1) and (-2,3).

(5)