

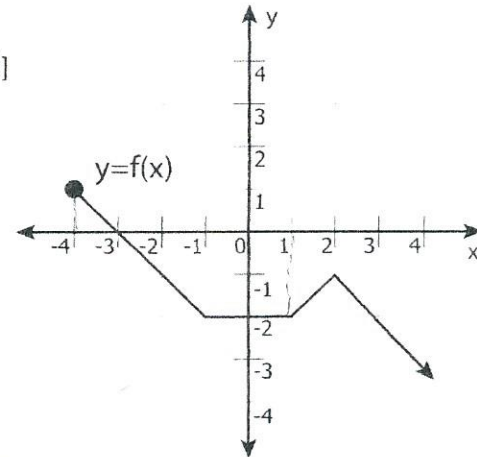
Name: Solutions

Show ALL of your work for full credit. Simplify your answers as much as possible. Each problem (as well as each part) is worth 6 points unless otherwise specified.

1. Use the function $f(x)$ pictured to determine the following. [10 pts. total]

A. $f(1) = -2$

B. $f(-4) = 1$



2. Find the domain of each function. Write your answers using interval notation.

A. $f(x) = \frac{x+1}{2x-3}$

Since $2x-3 \neq 0$
 $x \neq \frac{3}{2}$



Domain: $(-\infty, \frac{3}{2}) \cup (\frac{3}{2}, \infty)$

B. $g(x) = \sqrt{x+5}$

$x+5 \geq 0$

$x \geq -5$

Domain: $[-5, \infty)$

3. Find the slope and y-intercept of $3y = 2x + 3$.

$y = \frac{2}{3}x + 1$

Slope = $\frac{2}{3}$, $b = 1$

y-intercept (0, 1)

4. Determine whether $x^2 + y = 4$ is symmetric to the x-axis.

$y = 4 - x^2$

Replace y by $-y$

$-y = 4 - x^2$

$y = x^2 - 4$

So $x^2 + y = 4$ is not symmetric to x-axis

5. Consider the line defined by $3y - x = 6$.

$3y = x + 6 \rightarrow y = \frac{1}{3}x + 2$

A. Find the slope of the perpendicular line.

Slope of the perpendicular line = $-\left(\frac{1}{3}\right) = -3$

B. Write the slope-intercept equation of the perpendicular line passing through the point (3, -2).

Equation of the perpendicular line thro' (3, -2) with slope -3 is

$y - (-2) = -3(x - 3)$

$y + 2 = -3x + 9$

$y = -3x + 7$

6. A speeding ticket is \$100 plus \$5 for every 1 mph (mile per hour) over the speed limit.

A. Write a linear function to model the cost $C(x)$, in dollars, of a speeding ticket for a person caught driving x mph over the speed limit.

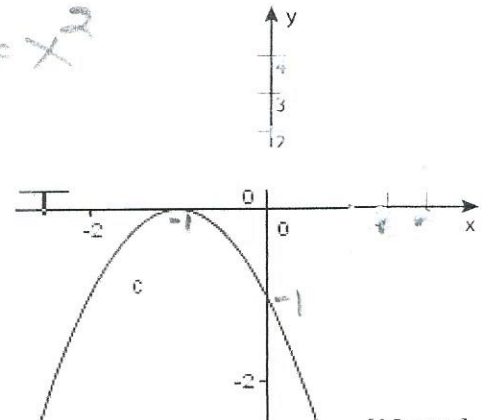
$$C(x) = 100 + 5x$$

B. Evaluate $C(15)$ and interpret the meaning in the context of this problem.

$$C(15) = 100 + 5(15) \\ = \$175$$

7. Sketch a graph of $g(x) = -(x+1)^2$. List any shifts and reflections used to graph this function. [12 pts.]

parent function is $y = x^2$



Shift: 1 unit to the left then

Reflection: reflect

8. Determine if the function $f(x) = x^3 + x$ is even, odd, or neither. Show your work for each case. [12 pts.]

$f(x)$ is even if
 $f(-x) = f(x)$

$f(x)$ is odd if
 $f(-x) = -f(x)$

$$f(x) = x^3 + x$$

$$\therefore f(-x) = (-x)^3 + (-x) \\ = -x^3 - x \\ = -(x^3 + x) \\ = -f(x)$$

So $f(x)$ is odd

9. Evaluate the piecewise function for the given values of x .

A. $f(3)$

$$f(3) = 3^2 + 3 \\ = 9 + 3 \\ = 12$$

B. $f(6) = 5$

C. $f(-4)$

$$= 2(-4) + 1 \\ = -8 + 1 \\ = -7$$

$$f(x) = \begin{cases} 2x+1 & \text{for } x < -1 \\ x^2+3 & \text{for } -1 \leq x < 4 \\ 5 & \text{for } x \geq 4 \end{cases}$$