

READ AND FOLLOW ALL DIRECTIONS. CIRCLE YOUR FINAL ANSWERS.  
SHOW ALL WORK TO RECEIVE FULL CREDIT. NO CALCULATORS.

1. (8 points) Consider the following graphs. Decide if each is or is not the graph of  $y$  as a function of  $x$ . Explain your reason.

(a)

(b)

2. (12 points) Write a general formula for each variation.

(a)  $v$  varies directly with  $t$ ;  $v = 16$  when  $t = 2$

(b)  $F$  varies inversely with  $d^2$ ;  $F = 2$  when  $d = 5$

## Test #1

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3. (14 points) Let  $f(x) = 3x^2 - 4x$ . Evaluate the following, and be sure to simplify your answers.

(a)  $f(-2)$

(b)  $f(x + 2)$

(c)  $f(-x)$

4. (10 points) Let  $f(x) = \frac{2x^2-3}{7-x}$  and  $g(x) = \sqrt{x+5}$ .

(a) Identify the domain of  $f$ .

(b) Identify the domain of  $g$ .

5. (10 points) For the following relations, explain why each is or is not a function.

(a)  $\{(x, y) | x = y^2\}$

(b)  $\{(2, -6), (-3, 6), (4, 9), (3, 4)\}$

# Test #1

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(c) The relation where each student is paired with their GPA.

6. (12 points) Consider the piecewise-defined function

$$g(x) = \begin{cases} x + 3 & \text{if } -10 \leq x < -6 \\ -3 & \text{if } -6 \leq x < 5 \\ -2x - 3 & \text{if } 5 \leq x \leq 10 \end{cases}$$

Evaluate:

(a)  $g(-6)$

(b)  $g(5)$

(c)  $g(-10)$

7. (20 points) Let  $f(x) = \sqrt{x+6}$

(a) Identify the domain of  $f$ .

(b) Is the point  $(3, 3)$  on the graph of  $f$ ?

# Test #1

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- (c) What is  $f(10)$ ?
- (d) What are the x-intercepts, if any, of  $f$ ?
- (e) What is the y-intercept, if any, of  $f$ ?
8. (14 points) Let  $f(x) = x^2 + 6$  and  $g(x) = \sqrt{x^3 + 3}$ . Find the following functions.
- (a)  $(f/g)(x)$
- (b)  $(f \circ g)(x)$
9. (5 points) EXTRA CREDIT. Define the term relation. Is every relation a function? Why or why not?