

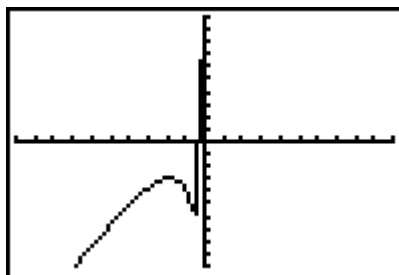
Name: \_\_\_\_\_ Date: \_\_\_\_\_

1. Given  $x^2 + y^2 = 9$ , use the algebraic tests to determine symmetry with respect to both axes and the origin.
  - A)  $y$ -axis symmetry only
  - B)  $x$ -axis symmetry only
  - C) origin symmetry only
  - D)  $x$ -axis,  $y$ -axis, and origin symmetry
  - E) no symmetry

2. Use a graphing utility to graph the equation and find all intercepts. Approximate any intercepts to the nearest hundredth if necessary. Use the standard graphing window size.

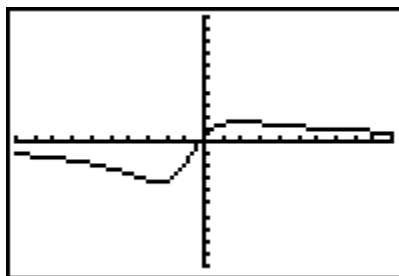
$$y = \frac{9x+2}{x^2+2x+5}$$

A)



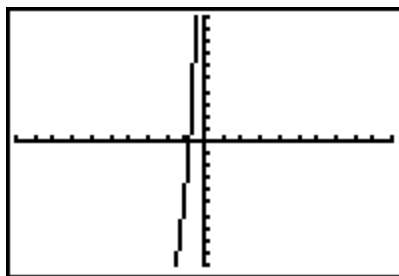
$x$ -intercept(s):  $(-0.25, 0)$ ;  $y$ -intercept: none

B)



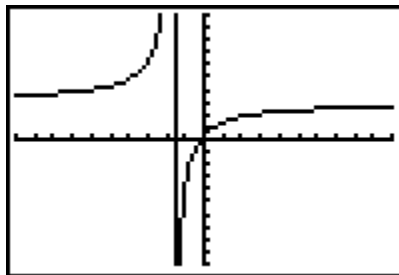
$x$ -intercept(s):  $(-0.22, 0)$ ;  $y$ -intercept:  $(0, 0.4)$

C)



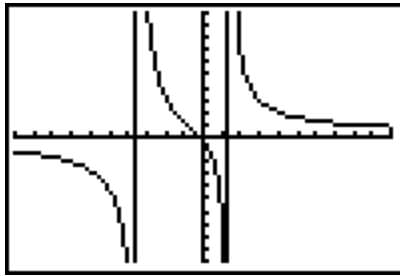
$x$ -intercept(s):  $(-0.77, 0)$ ;  $y$ -intercept: none

D)



$x$ -intercept(s):  $(-0.22, 0)$ ;  $y$ -intercept:  $(0, 0.4)$

E)



$x$ -intercept(s):  $(-0.22, 0)$ ;  $y$ -intercept:  $(0, -0.4)$

3. Find the slope-intercept form of the line passing through the points.

$(9, 3), (8, -9)$

A)  $y = 12x - 27$

B)  $y = 12x - 105$

C)  $y = \frac{1}{0.75}x + \frac{14}{3}$

D)  $y = -\frac{1}{0.75}x - \frac{7}{3}$

E)  $y = -12x + 111$

4. Find the domain of the function.

$$g(s) = \frac{-8s}{s+6}$$

A) all real numbers  $s \neq -6$

B) all real numbers  $s \neq -6, s \neq 0$

C) all real numbers

D)  $s = -6, s = 0$

E)  $s = -6$

5. Find the domain of the function.

$$f(y) = \sqrt{81 - y^2}$$

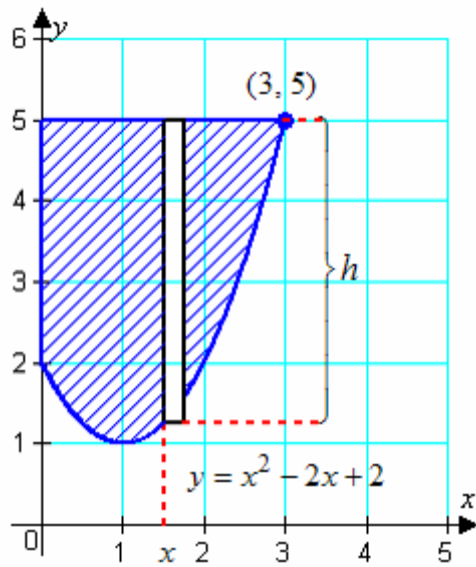
- A)  $-6 \leq x \leq 6$
- B)  $x \leq -6$  or  $x \geq 6$
- C)  $x \geq 0$
- D)  $x \leq 6$
- E) all real numbers

6. Find the average rate of change of the function from  $x_1$  to  $x_2$ .

$$f(x) = x^2 + x + 3 \quad x_1 = 2, x_2 = 4$$

- A) 2
- B) -14
- C) 14
- D) 12
- E) 7

7. Write the height  $h$  of the rectangle as a function of  $x$ .



A)

$$h(x) = -x^2 + 2x + 3$$

B)

$$h(x) = -x^2 - 2x + 7$$

C)

$$h(x) = x^2 + 2x - 3$$

D)

$$h(x) = x^2 - 2x - 5$$

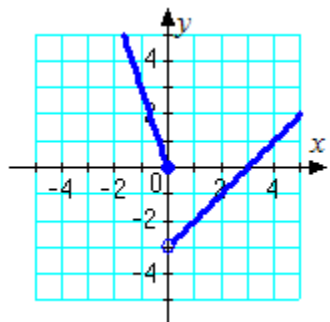
E)

$$h(x) = -x^2 + 2x - 5$$

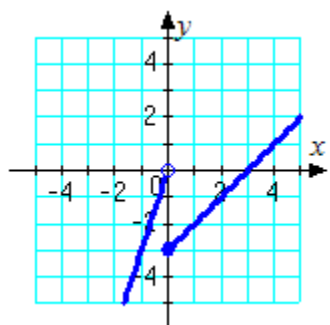
8. Which graph represents the function?

$$f(x) = \begin{cases} -3x, & x < 0 \\ x-3, & x \geq 0 \end{cases}$$

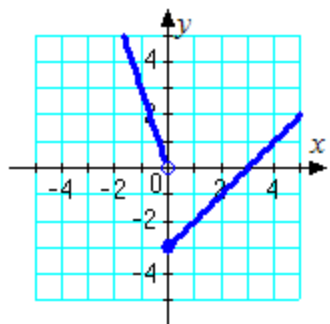
A)



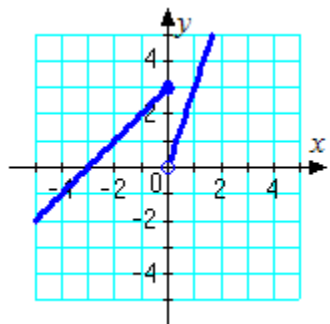
B)



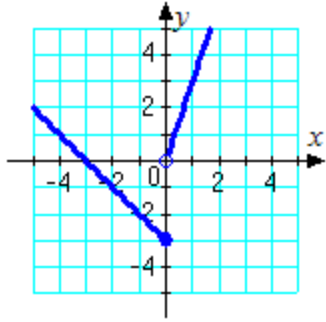
C)



D)



E)



9. Describe the sequence of transformations from the related common function  $f(x) = x^3$  to  $g$ .

$$g(x) = 5(x - 2)^3$$

- A) horizontal shift 5 units right; then vertical stretch by a factor of 5
- B) horizontal shift 5 units left; then vertical stretch by a factor of 5
- C) horizontal shift 5 units left; then vertical shrink by a factor of 5
- D) vertical shift 5 units up; then vertical shrink by a factor of 5
- E) vertical shift 5 units down; then vertical shrink by a factor of 5

10. Write an equation for the function that is described by the following characteristics:

the shape of  $f(x) = x^2$ , but moved nine units down, three units to the left, and then reflected in the  $x$ -axis

- A)  $g(x) = 3 - (x - 7)^2$
- B)  $g(x) = 4 - (x + 5)^2$
- C)  $g(x) = -(x + 6)^2 - 4$
- D)  $g(x) = -(x + 3)^2 - 7$
- E)  $g(x) = 7 - (x + 3)^2$

11. Find  $f \circ g$ .

$$f(x) = 2x - 1 \quad g(x) = x - 3$$

A)  $(f \circ g)(x) = 2x - 7$

B)  $(f \circ g)(x) = 2x - 4$

C)  $(f \circ g)(x) = 2x^2 - 7x + 3$

D)  $(f \circ g)(x) = x + 2$

E)  $(f \circ g)(x) = x - 4$

12. The monthly cost  $C$  of running the machinery in a factory for  $t$  hours is given by

$$C(t) = 30t + 500.$$

The number of hours  $t$  needed to produce  $x$  products is given by

$$t(x) = 4x.$$

Find the equation representing the cost  $C$  of manufacturing  $x$  products.

A)  $C(x) = 280x + 400$

B)  $C(x) = 280x + 28000$

C)  $C(x) = 79x + 500$

D)  $C(x) = 74x + 470$

E)  $C(x) = 70x + 418$

13. After determining whether the variation model below is of the form  $y = kx$  or  $y = \frac{k}{x}$ , find the value of  $k$ .

$x$	24	48	72	96	120
$y$	$\frac{1}{36}$	$\frac{1}{72}$	$\frac{1}{108}$	$\frac{1}{144}$	$\frac{1}{180}$

- A)  $k = \frac{1}{24}$   
B)  $k = \frac{2}{3}$   
C)  $k = \frac{1}{12}$   
D)  $k = \frac{5}{4}$   
E)  $k = \frac{3}{2}$

14. After determining whether the variation model below is of the form  $y = kx$  or  $y = \frac{k}{x}$ , find the value of  $k$ .

$x$	80	85	90	95	100
$y$	48	51	54	57	60

- A)  $k = 5$   
B)  $k = \frac{1}{5}$   
C)  $k = \frac{5}{3}$   
D)  $k = \frac{3}{5}$   
E)  $k = \frac{5}{48}$

15. Find a mathematical model for the verbal statement:

"The force of attraction  $F$  between two oppositely charged particles varies directly as the product of the magnitudes  $Q_1$  and  $Q_2$  of the charges and inversely as the square of the distance  $d$  between the particles."

A)

$$F = kQ_1 Q_2 d^2$$

B)

$$F = \frac{kQ_1}{Q_2 d^2}$$

C)

$$F = \frac{kQ_1 Q_2}{d^2}$$

D)

$$F = \frac{kQ_2}{Q_1 d^2}$$

E)

$$F = \frac{k d^2}{Q_1 Q_2}$$

16. Find all real zeros of the polynomial  $f(x) = x^3 + 9x^2 - 49x - 441$  and determine the multiplicity of each.

A)  $x = 6$ , multiplicity 2;  $x = 5$ , multiplicity 1

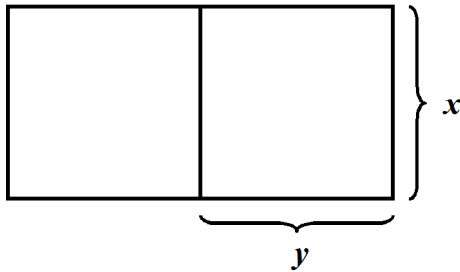
B)  $x = 9$ , multiplicity 1;  $x = -9$ , multiplicity 1;  $x = 2$ , multiplicity 1

C)  $x = 5$ , multiplicity 2;  $x = -6$ , multiplicity 1

D)  $x = -6$ , multiplicity 1;  $x = -5$ , multiplicity 1;  $x = 5$ , multiplicity 1

E)  $x = 5$ , multiplicity 3

17. A farmer has 288 feet of fencing and wants to build two identical pens for his prize-winning pigs. The pens will be arranged as shown. Determine the dimensions of a pen that will maximize its area.



- A)  $27' \times 36'$   
B)  $45' \times 120'$   
C)  $21' \times 52'$   
D)  $13' \times 224'$   
E)  $10' \times 120'$
18. Write the standard form of the equation of the parabola that has a vertex at  $\left(\frac{-2}{3}, \frac{1}{9}\right)$  and passes through the point  $(2, -1)$ .

- A)  $f(x) = -\frac{5}{4}\left(x + \frac{2}{3}\right)^2 + \frac{1}{9}$   
B)  $f(x) = -\frac{5}{32}\left(x - \frac{3}{2}\right)^2 + \frac{1}{9}$   
C)  $f(x) = -\frac{5}{32}\left(x + \frac{2}{3}\right)^2 + \frac{1}{9}$   
D)  $f(x) = -\frac{5}{4}\left(x - \frac{2}{3}\right)^2 - \frac{1}{9}$   
E)  $f(x) = -\frac{5}{8}\left(x - \frac{3}{2}\right)^2 - \frac{1}{9}$

19. From the graph of the quadratic function  $f(x) = (x - 3)^2 - 1$ , determine the equation of the axis of symmetry.

- A)  $x = 3$
- B)  $x = -1$
- C)  $x = 1$
- D)  $x = -3$
- E)  $x = \frac{1}{3}$

20. If  $x = \sqrt{7}$  is a root of  $x^3 + x^2 - 7x - 7 = 0$ , use synthetic division to factor the polynomial completely and list all real solutions of the equation.

- A)  $(x - 1)(x - \sqrt{7})^2$ ;  $1, \sqrt{7}$
- B)  $(x - 1)^2(x - \sqrt{7})$ ;  $1, \sqrt{7}$
- C)  $(x + 1)(x - \sqrt{7})(x + \sqrt{7})$ ;  $-1, \sqrt{7}, -\sqrt{7}$
- D)  $(x + 1)(x + \sqrt{7})^2$ ;  $-1, -\sqrt{7}$
- E)  $(x + 1)(x + \sqrt{7})^2$ ;  $-1, -\sqrt{7}$

21. Use synthetic division to divide.

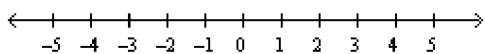
$$\begin{array}{r} 12x^3 + 49x^2 + 35x - 12 \\ \hline 4x - 1 \end{array}$$

- A)  $4x^2 + 28x + 16$
- B)  $9x^2 + 36x + 12$
- C)  $48x^2 + 28x + 144$
- D)  $12x^2 + 84x + 144$
- E)  $3x^2 + 13x + 12$

22. Find all  $x$ -intercepts for the function  $y = \frac{-6x+7}{7x+6}$ .

- A)  $x = -\frac{3}{5}$
- B)  $x = \frac{7}{2}$
- C)  $x = -\frac{1}{3}$
- D)  $x = \frac{1}{3}$
- E) There are no  $x$ -intercepts.

23. Graph the solution of  $x^2 - 5x - 14 \geq 0$  on a number line.



- A) 

-2
- B) 

-2                      7
- C) 

5
- D) 

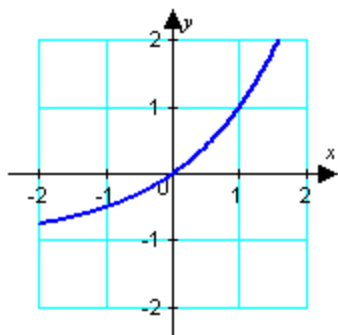
-2                      7
- E) 

-7                      2

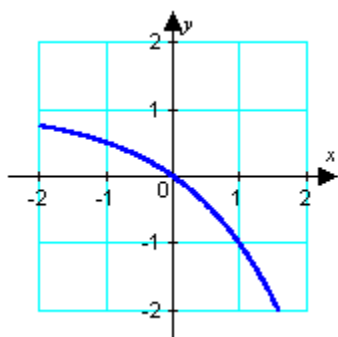
24. Identify the graph of the function.

$$f(x) = 1 - 2^x$$

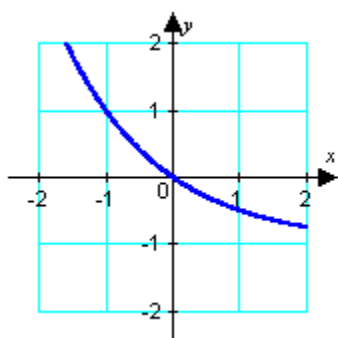
A)



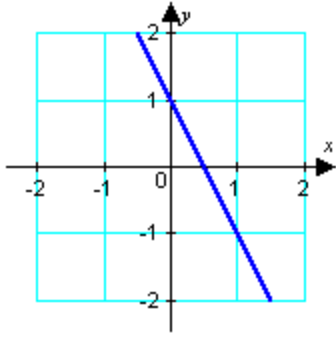
B)



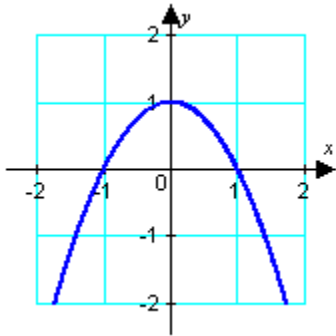
C)



D)



E)



## Answer Key - Untitled Exam-1

1. D
2. B
3. B
4. A
5. A
6. E
7. A
8. C
9. A
10. B
11. A
12. A
13. B
14. D
15. C
16. B
17. A
18. C
19. A
20. C
21. E
22. B
23. B
24. B