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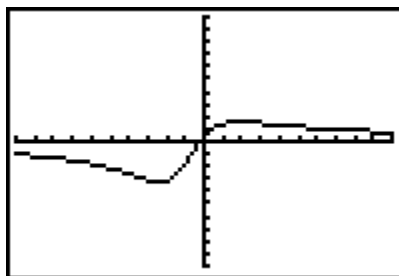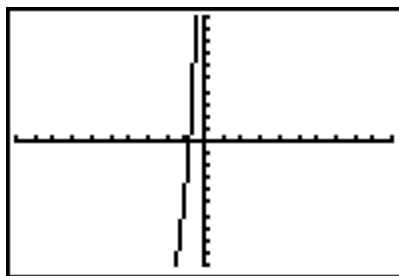
$$y = \frac{9x + 2}{x^2 + 2x + 5}$$

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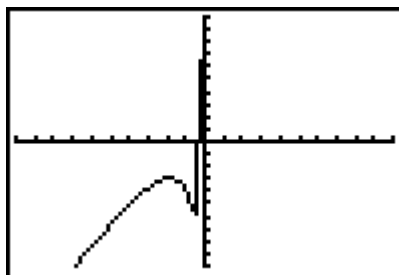
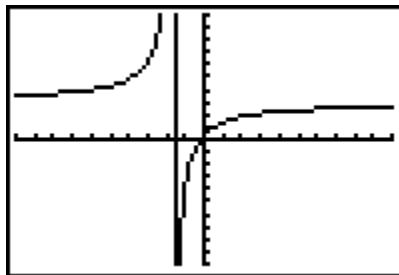   x-intercept(s): (–0.25, 0); y-intercept: none

B)

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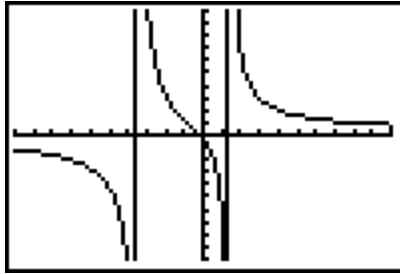
C)

   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) $y = \dfrac{1}{0.75}x + \dfrac{14}{3}$
D) $y = -\dfrac{1}{0.75}x - \dfrac{7}{3}$
E) $y = -12x + 111$

4. Find the domain of the function.

$$g(s) = \dfrac{-8s}{s+6}$$
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.
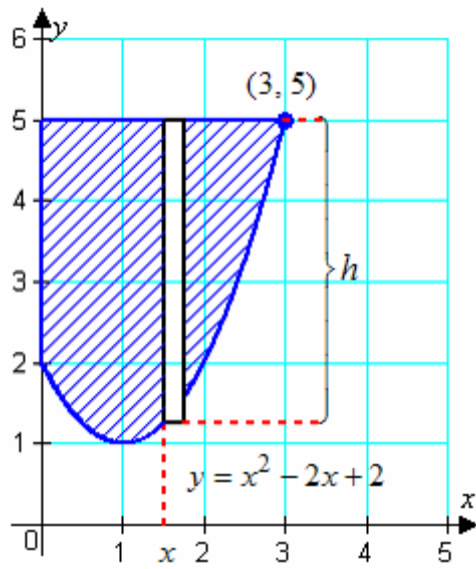
$$f(y) = \sqrt{81 - y^2}$$
A) $-6 \leq x \leq 6$
B) $x \leq -6$ or $x \geq 6$
C) $x \geq 0$
D) $x \leq 6$
E) all real numbers

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

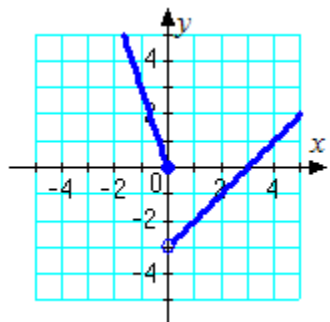7. Write the height h of the rectangle as a function of x.

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

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

C)
$$h(x) = x^2 + 2x - 3$$
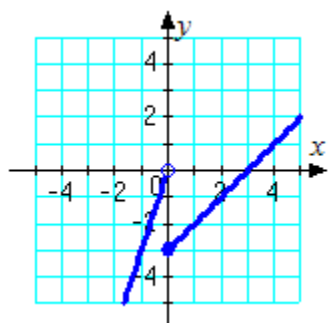
D)
$$h(x) = x^2 - 2x - 5$$

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

8. Which graph represents the function?

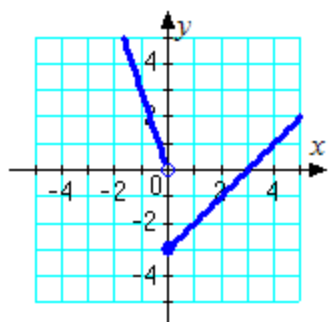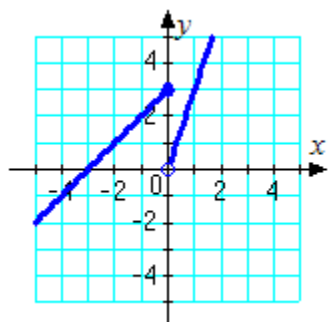$$f(x) = \begin{cases} -3x, & x < 0 \\ x-3, & x \geq 0 \end{cases}$$

A)

B)

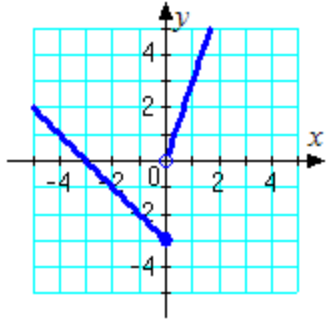C)

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
   F: shift 2 to right stretch 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) $g(x) = 7 - (x+3)^2$

F) g(x) = (x+3)^2 -9

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

F) $C(x) = 120x + 500$

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

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

A) $k = \dfrac{1}{24}$

B) $k = \dfrac{2}{3}$

C) $k = \dfrac{1}{12}$

D) $k = \dfrac{5}{4}$

E) $k = \dfrac{3}{2}$

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

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

A) $k = 5$

B) $k = \dfrac{1}{5}$

C) $k = \dfrac{5}{3}$

D) $k = \dfrac{3}{5}$

E) $k = \dfrac{5}{48}$

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)
$$F = \frac{kd^2}{Q_1 Q_2}$$

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

Chapter 5 section 5

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

F) x=-9, mult=1; x=-7, mult 1; x=7, mult 1

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.
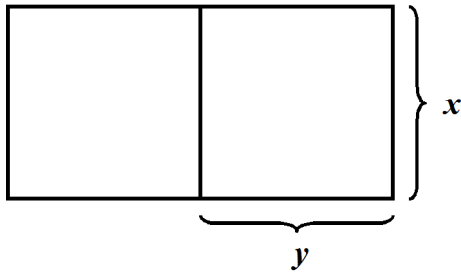
A) $27' \times 36'$

B) $45' \times 120'$

C) $21' \times 52'$

D) $13' \times 224'$

E) $10' \times 120'$

F) 48' x 36'

18. Write the standard form of the equation of the parabola that has a vertex at $\left(\dfrac{-2}{3}, \dfrac{1}{9} \right)$ and passes through the point $(2, -1)$.

A) $f(x) = -\dfrac{5}{4}\left(x + \dfrac{2}{3} \right)^2 + \dfrac{1}{9}$

B) $f(x) = -\dfrac{5}{32}\left(x - \dfrac{3}{2} \right)^2 + \dfrac{1}{9}$

C) $f(x) = -\dfrac{5}{32}\left(x + \dfrac{2}{3} \right)^2 + \dfrac{1}{9}$

D) $f(x) = -\dfrac{5}{4}\left(x - \dfrac{2}{3} \right)^2 - \dfrac{1}{9}$

E) $f(x) = -\dfrac{5}{8}\left(x - \dfrac{3}{2} \right)^2 - \dfrac{1}{9}$

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) $x = \dfrac{1}{3}$

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.
$$\frac{12x^3 + 49x^2 + 35x - 12}{4x - 1}$$

A) $4x^2 + 28x + 16$

B) $9x^2 + 36x + 12$

C) $48x^2 + 28x + 144$

D) $12x^2 + 84x + 144$

E) $3x^2 + 13x + 12$

F) 12x^2 +52x +48

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

A) $x = -\dfrac{3}{5}$

B) $x = \dfrac{7}{2}$
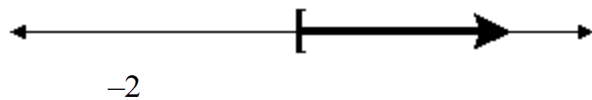
C) $x = -\dfrac{1}{3}$

D) $x = \dfrac{1}{3}$

E) There are no x-intercepts.

F) x= 7/6
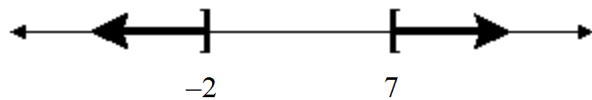
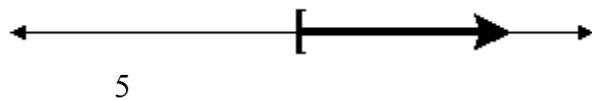23. Graph the solution of $x^2 - 5x - 14 \geq 0$ on a number line.
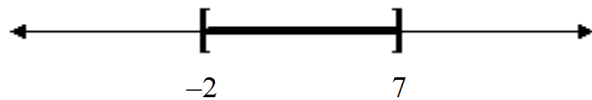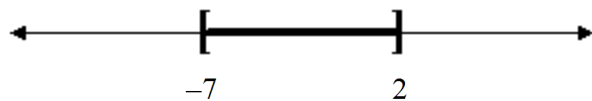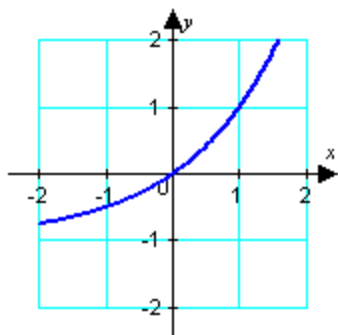

A)

−2

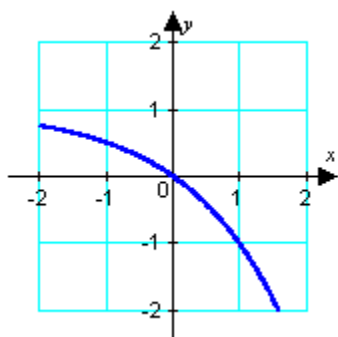B)

−2   7

C)

5

D)

−2   7

E)

−7   2
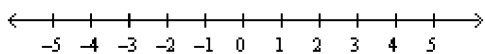
24. Identify the graph of the function.
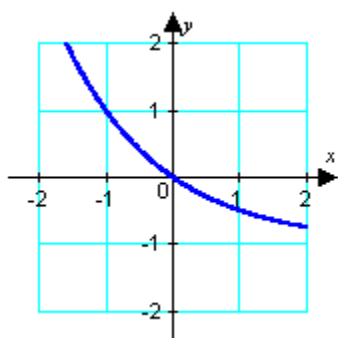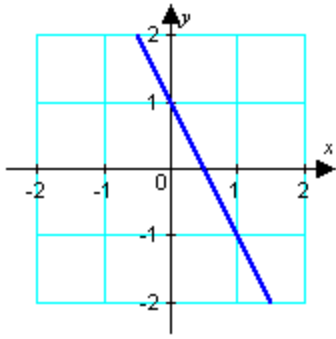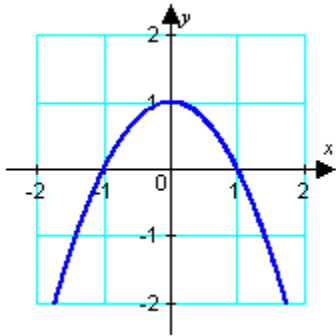
$$f(x) = 1 - 2^x$$

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~~ F
10. ~~B~~ F
11. A
12. ~~A~~ F
13. B
14. D
15. C
16. ~~B~~ F
17. ~~A~~ F
18. C
19. A
20. C
21. ~~E~~ F
22. ~~B~~ F
23. B
24. B