$$\frac{y_2 - y_1}{x_2 - x_1}$$

$$y = m(x - x_1) + y_1$$

$$y = mx + b$$

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$f(x) = ax^2 + bx + c$$

$$f(x) = a(x - h)^2 + k$$

$$\left(\frac{-b}{2a}, f\left(\frac{-b}{2a} \right) \right)$$

$$b^2 - 4ac$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$A = P\left(1 + \frac{r}{n} \right)^{(n \bullet t)}$$

$$A = Pe^{(r \bullet t)}$$

$$(x - h)^2 + (y - k)^2 = r^2$$

$$\log_a x = \frac{\log x}{\log a}$$

$$a^y = x \iff \log_a x = y$$

Math 1111 - Final Exam

Name _____

Date _____

Do all work on this test booklet.

Multiple Choice (3 points each): Choose the correct answer and write the corresponding
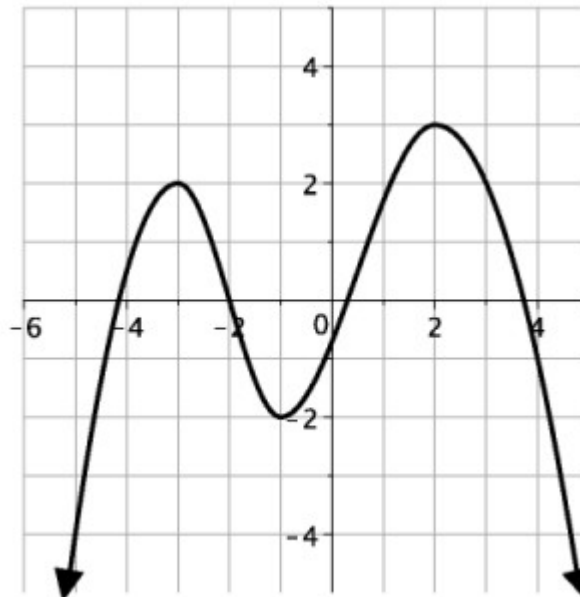letter on the blank or bubble it in on the scantron sheet, if provided.

_____1.) If you rent a van for one day and drive it 250 miles, the cost is $100. If you
drive it 300 miles, the cost is $115. Let x represent the miles driven, and let y represent
the cost. Find a linear equation represented by this data.

a.) $y = \$0.30x + \$25$
b.) $y = \$3.10x - \$650$
c.) $y = \$0.40x$
d.) $y = \$0.50x + \$50$

_____2.) Find the vertex of $f(x) = 3x^2 + 30x + 78$
a.) (3, -5)
b.) (-3, 5)
c.) (5, -3)
d.) (-5, 3)

_____3.) The graph of a function is given below. Over what interval(s) is this function
increasing?

a.) $(-\infty, -3) \cup (-1,2)$
b.) $(-3,-1) \cup (2,\infty)$
c.) $(-\infty, -2) \cup (-2,3)$
d.) $(2,-2) \cup (3,-\infty)$

_____4.) An initial investment of $1000 is appreciated for 10 years in an account that earns 9% interest, compounded annually. Find the total amount of money in the account at the end of the period.

a.) $ 2367.36
b.) $ 1367.36
c.) $ 2580.43
d.) $ 2171.89

_____5.) Evaluate $\log_8 32$

a.) 4   b.) 40   c.) 5/3   d.) 3/5

_____6.) Solve: $6 - 8x > 12$

a.) $\left\{ x \mid x < \dfrac{-9}{4} \right\}$

b.) $\left\{ x \mid x < \dfrac{-3}{4} \right\}$

c.) $\left\{ x \mid x > \dfrac{-9}{4} \right\}$

d.) $\left\{ x \mid x < \dfrac{3}{2} \right\}$

_____7.) Divide. Write answer in standard form. $\dfrac{2-3i}{4+5i}$

a.) $\dfrac{8 - 22i + 15i^2}{41}$

b.) $-\dfrac{7}{41} - \dfrac{22}{41}i$

c.) $\dfrac{23}{9} + \dfrac{22}{9}i$

d.) $\dfrac{23}{9} - \dfrac{2}{9}i$

_____8.) Solve by quadratic formula: $4x^2 - 2x - 1 = 0$

a.) $\left\{\dfrac{-1 \pm \sqrt{5}}{4}\right\}$

b.) $\left\{\dfrac{1 \pm \sqrt{5}}{4}\right\}$

c.) $\left\{\dfrac{1 \pm \sqrt{15}}{4}\right\}$

d.) $\left\{\dfrac{2 \pm \sqrt{2}}{4}\right\}$

_____9.) Bob's gas tank is $\dfrac{3}{5}$ full. After he buys 4 gallons of gas, it is $\dfrac{4}{5}$ full. How many gallons of gas does Bob's tank hold?

a.) 20 gallons
b.) 15 gallons
c.) 8 gallons
d.) 1.4 gallons

_____10.) The length of a rectangle is 7 m more than twice the width, and the area is 130 m². Find the dimensions of the rectangle.

a.) 6.7 m by 19.4 m
b.) 6.6 m by 19.7 m
c.) 6.5 m by 20 m
d.) 6.4 m by 20.3 m

_____11.) Find the midpoint of the segment between (4,1) and (-3,8).

a.) $\left(\dfrac{7}{2}, \dfrac{-7}{2}\right)$

b.) $\left(\dfrac{1}{2}, \dfrac{9}{2}\right)$

c.) (-1, 9)

d.) $\left(\dfrac{-3}{4}, 8\right)$

_____12.) Find the exact distance between (4,1) and (-3,8).

      a.) $\sqrt{130}$

      b.) $7\sqrt{2}$

      c.) 9

      d.) $\sqrt{73}$

_____13.) Find the equation of the circle whose diameter has endpoints (0, 2) and (6,8).

      a.) $(x - 3)^2 + (y - 5)^2 = 18$

      b.) $(x + 3)^2 + (y + 5)^2 = \sqrt{18}$

      c.) $x^2 + (y - 2)^2 = 72$

      d.) $(x - 6)^2 + (y - 6)^2 = 16$

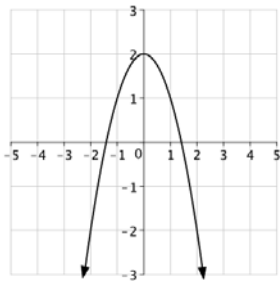_____14.) Write the equation of the line perpendicular to $y = 6 - \dfrac{1}{2}x$ through (-4,7).

      a.) $y = \dfrac{-1}{2}x + 5$

      b.) $y = \dfrac{1}{2}x + 9$

      c.) $y = 2x + 15$

      d.) $y = -2x - 1$

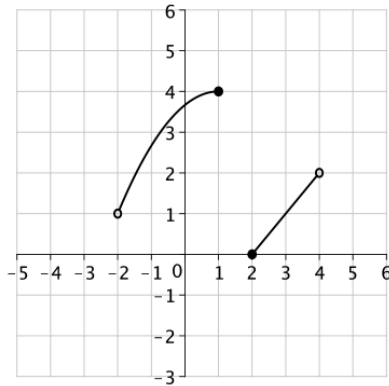_____15.) Which of the following is (are) even functions?

i.   ii. $y = -x^3$ iii. $y = (x - 3)^2$

      a.) i

      b.) ii

      c.) iii

      d.) i and iii

_____ 16.) Find the domain and range of the piecewise defined function on the graph below:

a.) D: [-2,2], R: [0, 4]
b.) D: (-2, 1] ∪ [2, 4), R: [0, 4]
c.) D: [-2, 1] ∪ [0, 2], R: [2, 4]
d.) D: (-2, 4), R: [0,4]

_____ 17.) Given: $f(x) = 3x + 2$ and $g(x) = x^2 + 1$. Find: $g(f(x))$

a.) $3x^2 + 5$
b.) $3x^2 + 3x + 3$
c.) $9x^2 + 6x + 5$
d.) $9x^2 + 12x + 5$

_____ 18.) Given: $f(x) = \dfrac{x+1}{x-3}$. Find all of the asymptotes.

a.) x = 3, y = -1
b.) x = 3, y = 0
c.) x = 3, y = 1
d.) x = 3, y = ⅓

._____ 19.) The one-to-one function h is defined as $h(x) = 2x^3 + 3$. Find: $h^{-1}(x)$.

a.) $h^{-1}(x) = \sqrt[3]{\dfrac{x-3}{2}}$

b.) $h^{-1}(x) = \sqrt[3]{2x} - 3$

c.) $h^{-1}(x) = \sqrt[3]{\dfrac{x}{2} - 3}$

d.) $h^{-1}(x) = \sqrt[3]{\dfrac{x}{2}} - \dfrac{3}{2}$

_____20.) Write as a logarithmic equation: $2^5 = 32$.

        a.) $\log_2 5 = 32$

        b.) $\log_{32} 2 = 5$

        c.) $\log_5 32 = 2$

        d.) $\log_2 32 = 5$

Free Response. (3 points each). Show all work with problem. Write your answer on the blank before the problem number.

_____21.) Solve: $\dfrac{x+2}{4} + \dfrac{3-5x}{3} = 7$

_____22.) Solve: $|2x - 4| = 4$

_____ 23.) Solve: $4|x + 1| - 6 \le 30$

_____24.) Solve: $\sqrt{x+2} = 16$

_____25.) Solve: $\dfrac{3}{x+2} = -6$

_____26.) Write the equation, in slope intercept form, of the line through (1, -5) with slope $= \dfrac{2}{3}$.

_____27.) Solve: $\left(\dfrac{1}{4}\right)^{-7x+3} = (64)^{2x+1}$

_____ 28.) Find the exact solution for $\ln(x + 2) = -3$

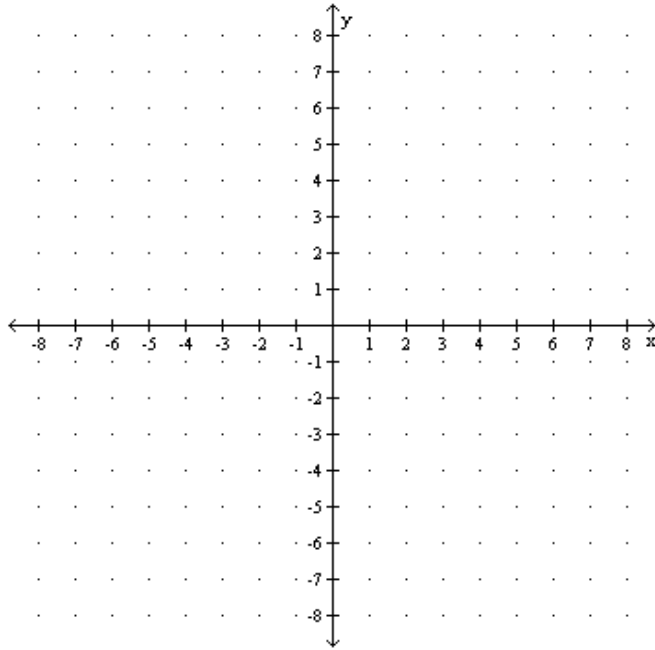_____ 29.) Find all solutions: $\log_2(x+8) = 4 - \log_2(x-7)$

_____ 30.) Solve the system: $3x + 2y = 18$
$$4x - y = 6$$
Answer should be exact.

Graphs (5 points each)

31.) Given: y = (x + 1)² - 3
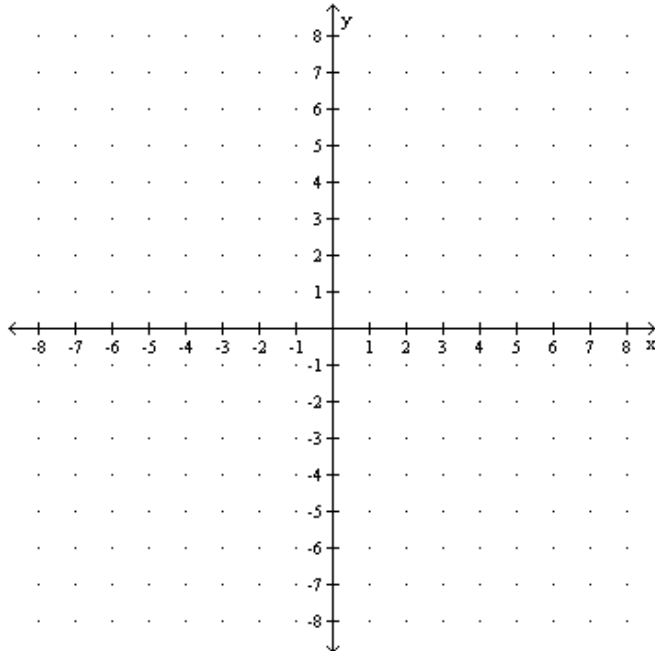   Identify the vertex._____
    Plot the vertex and at least 4 other points, then draw the graph.

32.) Given: $y = e^{x+1} - 2$.
    Identify the asymptote. _____
    Draw the asymptote, plot at least 4 points, then draw the graph.

Answer Key for MATH 1111 Spring 2012

1	a
2	d
3	a
4	a
5	c
6	b
7	b
8	b
9	a
10	c
11	b
12	b
13	a
14	c
15	a
16	b
17	d
18	c
19	a
20	d
21	-66/17
22	0 or 4
23	[-10,8]
24	254
25	-2.5
26	2/3 x - 17/3 = y
27	6
28	e^(-3) -2
29	8
30	(30/11, 54/11)