M122 EXAM 2 CHAPTER 2 SCORE____ NAME_____
Practice Exam
DIRECTIONS: Show all work on this test paper. Each problem is worth 4 points unless stated otherwise.

Determine if the graph of the function is concave up or concave down. (2 points each)

1) $y = x^2 - 4x + 4$ 1) _____

2) $y = -(x + 2)^2 - 5$ 2) _____

3) Find the vertex of problem #2 above. (2 points) 3) _____

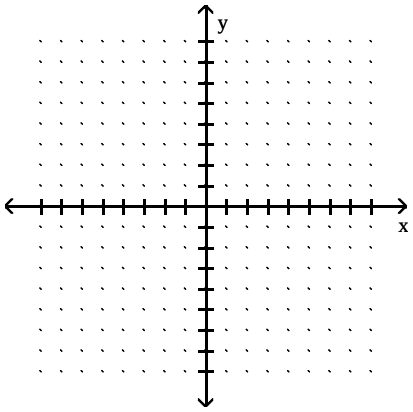
Determine if the vertex of the graph is a a) maximum point or a minimum point. Find b) the coordinates of the vertex.

4) $y = x^2 - 4x + 4$ 4) a. _____

b. _____

Give the coordinates of the vertex and graph the equation in a window that includes the vertex. Make sure to show a complete graph. Put a few labels on each axis.

5) $y = 2x^2 - 60x + 16$ 5) _____



Solve the problem.

6) Bob owns a watch repair shop. He has found that the cost of operating his shop is given by $c(x) = 4x^2 - 384x + 71$, where x is the number of watches repaired. How many watches must he repair to have the lowest cost? 6) _____

7) The polynomial function $I(t) = -0.1t^2 + 1.5t$ represents the yearly income (or loss) from a real estate investment, where t is time in years. After how many years does income begin to decline? (2 points) 7) _____

Use factoring to solve the equation. Show all work necessary to justify your answer.

8) $x^2 - 4x - 32 = 0$ 8) _____

9) $15y^2 + 37y + 20 = 0$ 9) _____

Use the quadratic formula to solve the equation. Show all work and give your answer in simplest radical form.

10) $p^2 + 5p - 5 = 0$ 10) _____

Solve the problem.

11) If an object is propelled upward from a height of 48 feet at an initial velocity of 64 feet per second, then its height after t seconds is given by the equation $h = -16t^2 + 64t + 48$, where h is in feet. After how many seconds will the object reach a height of 112 feet? 11) _____

12) At Allied Electronics, production has begun on the X−15 Computer Chip. The total revenue function is given by $R(x) = 54x - 0.3x^2$ and the total profit function is given by $P(x) = -0.3x^2 + 49x - 10$, where x represents the number of boxes of computer chips produced. The total cost function, C(x), is such that $C(x) = R(x) - P(x)$.a) Find C(x).
b) Find C(10). 12) a. _____

b. _____

13) Suppose the price p of bolts is related to the quantity q that is demanded by: 13) _____

$$p = 560 - 4q^2$$

where q is measured in hundreds of bolts. Suppose the supply function for bolts is given by

$$p = 4q^2,$$

where q is the number of bolts (in hundreds) that are supplied at price p. Find the equilibrium price.

Solve the following equations algebraicially equation. Show work to justify your answer.

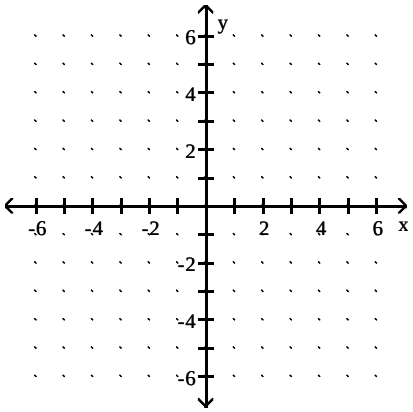
14) $\sqrt{5x - 9} + 9 = x$ 14) _____

Use the quadratic formula or graphing methods to solve the inequality.

15) $6x^2 - 27x + 6 \leq 0$ 15) _____

Graph.

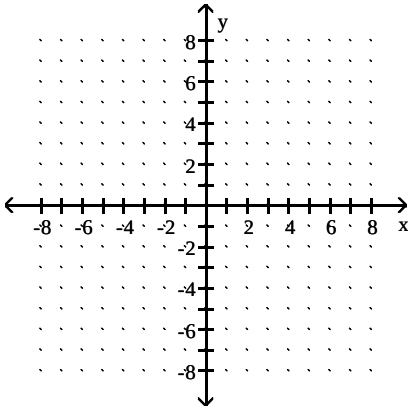
16) $f(x) = \dfrac{1}{x - 1}$ 16)



Graph the function.

17) 17)

$$f(x) = \begin{cases} x - 5, & \text{if } x > 0 \\ 1, & \text{if } x \le 0 \end{cases}$$



Determine if the function is increasing or decreasing over the interval indicated.

18) $f(x) = x^2 - 2x + 1$; $(1, \infty)$ (2 points) 18) _____

Solve the problem.

19) The distance an object is from the ground after being tossed from a hot air balloon 840 feet in the air is a function of time. 19) _____

$y = -16.1t^2 + 5.8t + 840,$

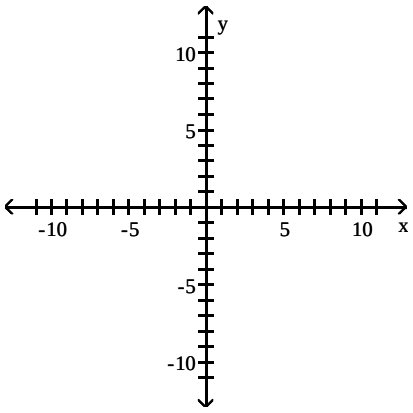
where y is height and t is the amount of time the object has been in the air. Find the height of the object after 5.5 seconds.

Fill in each blank with the appropriate response.

20) The graph of $y = -5(x + 3)^2 - 8$ can be obtained from the graph of $y = x^2$ by shifting horizontally _____ units to the _____ , vertically stretching by a factor of ____ , reflecting across the ____-axis, and shifting vertically _____ units in the _____ direction. 20)

Sketch the graph of the pair of functions. Use a dashed line for g(x).

21) $f(x) = |x|$, $g(x) = \frac{1}{2}|x + 6| - 4$ 21)



Find a power function that models the data in the table. Round to three decimal places if necessary.

22)

x	1	2	3	4	5	6	7	8	9
y	5	13	27	39	59	74	96	116	136

22) _____

Solve the problem.

23) A furniture manufacturer decides to make a new line of desks. The table shows the profit, in thousands of dollars, for various levels of production.

Number of Desks Produced	120	350	500	650	750
Profit (Thousands)	13	37	44	34	25

a) Find a quadratic function to model the data, and b) use the model to predict the profit if 450 desks are made.

23) a. _____

b. _____

For the pair of functions, perform the indicated operation.

24) a) If $f(x) = 5x^2 - 6$, $g(x) = 7x - 8$, find $(f - g)(x)$

b) If $f(x) = 5x + 6$ and $g(x) = 4x + 1$ find $(f \cdot g)(x)$.

24) a. _____

b. _____

Find the specified domain.

25) For $f(x) = x^2 - 1$ and $g(x) = 2x + 3$, what is the domain of $\left(\frac{f}{g}\right)(x)$?

(2 points)

25) _____

Find the requested composition of functions.

26) Given $f(x) = \frac{x - 9}{2}$ and $g(x) = 2x + 9$, find a) $(g \circ f)(2)$ and b) $(g \circ f)(x)$.

26) a. _____

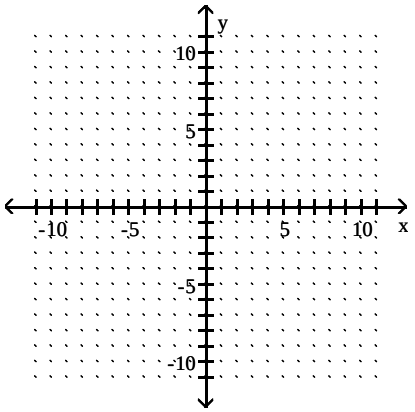
b. _____

Find the inverse of the function.

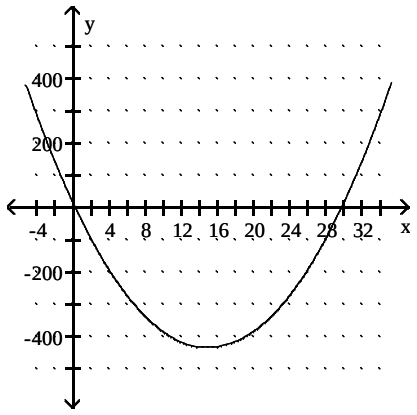
27) $f(x) = x^3 - 2$ 27) _____

Graph the given function as a solid line (or curve) and its inverse as a dashed line (or curve) on the same set of axes.

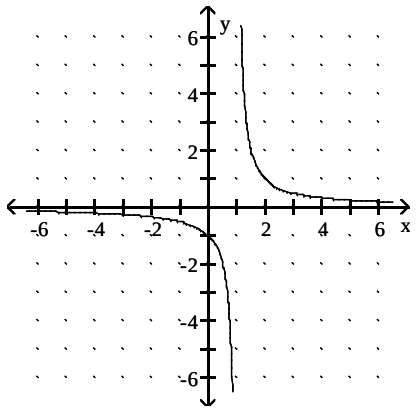
28) $f(x) = x^3 + 2$ 28)



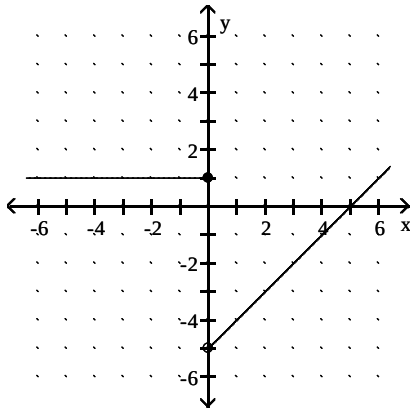
1) Concave up
2) Concave down
3) (–2, –5)
4) Minimum (2, 0)
5) Vertex: (15, −434)



6) 48 watches
7) 7.5 years
8) 8, –4
9) $-\frac{5}{3}, -\frac{4}{5}$
10) $\frac{-5 \pm 3\sqrt{5}}{2}$
11) 2 sec
12) C(x) = 5x + 10 b) 60
13) $280
14) x = 18
15) $\frac{9-\sqrt{65}}{4} \approx 0.234 \le x \le \frac{9+\sqrt{65}}{4} \approx 4.266$
16)



17)

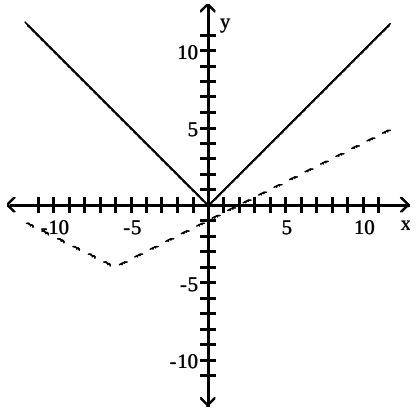


18) Increasing

19) 384.88 feet

20) 3; left; 5; x; 8; downward

21)



22) $y = 4.857x^{1.525}$

23) Almost $42,000

24) a) $5x^2 - 7x + 2$ b) $20x^2 + 29xx + 6$

25) $\left(-\infty, -\frac{3}{2}\right) \cup \left(-\frac{3}{2}, \infty\right)$

26) a) 2 b) x

27) $f^{-1}(x) = \sqrt[3]{x + 2}$

28)