Math 2200 ***Unit 3: TEST - Quadratic Functions*** **Name: _____**

Part A: Multiple Choice. (14 marks) ____ / 28 = ____ %

Place the **letter** of the correct response in the space provided. Please use **CAPITAL** letters.

1. What is the equation of the axis of symmetry of the function $y = -5(x-4)^2 + 3$? 1. ____

   A) $x = -5$ B) $x = -4$ C) $x = 3$ D) $x = 4$

2. What is the range of the function $y = 5(x+1)^2 - 4$? 2. ____

   A) $\{y / y \le -4, y \varepsilon R\}$

   B) $\{y / y \ge -4, y \varepsilon R\}$

   C) $\{y / y \le 4, y \varepsilon R\}$

   D) $\{y / y \ge 4, y \varepsilon R\}$

3. Which describes the graph of $y = 3(x+2)^2 + 4$ when compared to $y = x^2$? 3. ____

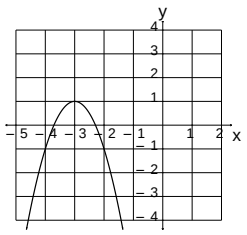
   A) opens up, wider, translated 2 unit left and 4 units up

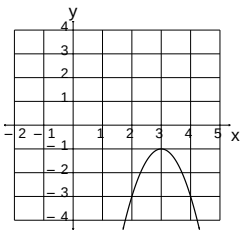
   B) opens up, narrower, translated 2 unit right and 4 units up

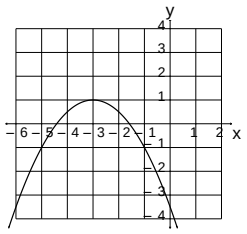
   C) opens up, wider, translated 2 unit right and 4 units up

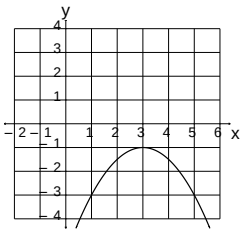
   D) opens up, narrower, translated 2 unit left and 4 units up

4. Which graph represents $y = -\frac{1}{2}(x-3)^2 - 1$? 4. ____

   A) 

   B) 

   C) 

   D) 

5. What is the standard form of the quadratic function $f(x) = 3(x-1)^2 - 25$? 5. ____

A) $f(x) = 3x^2 - 3x - 11$

B) $f(x) = 3x^2 - 6x - 22$

C) $f(x) = 3x^2 + 6x - 22$

D) $f(x) = 3x^2 - 6x - 11$

6. What is the *y*-intercept of the function $y = -\frac{1}{2}(x-4)^2 + 5$? 6. ____

A) -3

B) -4

C) 5

D) 13

7. Which quadratic function when graphed will have 1 *x*-intercept? 7. ____

A) $y = -2(x-1)^2 + 4$

B) $y = 2(x-1)^2 + 4$

C) $y = -2x^2 + 4$

D) $y = 2(x-1)^2$

8. The vertex of a parabola is located at $(-5, 6)$. If the parabola has a *y*-intercept of 231, which quadratic function represents the parabola? 8. ____

A) $f(x) = 9(x-5)^2 + 6$

B) $f(x) = 9(x+5)^2 + 6$

C) $f(x) = -9(x+5)^2 + 6$

D) $f(x) = 9(x-5)^2 - 6$

9. The path of a volleyball is given by $h = -\frac{1}{2}t^2 + 4t + 3$ where t is time in seconds and h is height in metres. At what time, in seconds, does the ball reach its maximum height? 9.___

A) 3
B) 4
C) 10.5
D) 11

10. What value of 'c' would make $y = x^2 + \frac{3}{4}x + c$ a perfect square? 10. ___

A) $\frac{9}{4}$ B) $\frac{3}{2}$ C) $\frac{3}{8}$ D) $\frac{9}{64}$

11. What is the vertex form of the quadratic function $y = x^2 - 14x + 15$? 11. ___

A) $y = (x-7)^2 - 34$

B) $y = (x-7)^2 + 64$

C) $y = (x-49)^2 + 181$

D) $y = (x-49)^2 + 211$

12. A theatre seats 400 people per show and is currently sold out with a ticket price of $10. A survey shows that for every $1 per ticket price increase, 25 fewer tickets will be sold. Which function models this situation? 12. ___

A) $R = (400x - 25)(10 + x)$
B) $R = (400 - 25x)(10 + x)$
C) $R = (400 - x)(10 + 25x)$
D) $R = (400x - 25)(10 + 25x)$

Part B: Long Answer Questions. Show ALL workings to receive FULL credit.

13. A soccer ball lying on the ground is kicked downfield and hits the ground 62 m away. The maximum height reached by the ball is 15 m.

    a) Algebraically determine the quadratic function that models the height of the ball.
    b) Use the function to determine the height of the ball when it is 48 m downfield.

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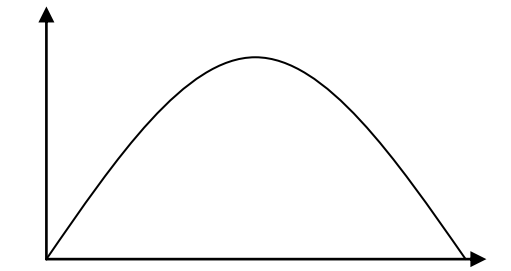

14. ***Using the process of completing the square***, convert $f(x) = -2x^2 + 12x - 5$ to vertex form.

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15. If the point (-1, 4) and (2, 13) are on the graph of the quadratic function $f(x) = 7x^2 + bx + c$, what are the values of *b* and *c*?

____ / 4

16. A rectangular region, placed against the wall of a house, is divided into three regions of equal area using a total of 80 m of fencing as shown. Algebraically determine the function which gives the area (*A*) of the entire region as a function of its width (*w*), and use this function to calculate the maximum possible area.

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