

Math 3206 Exam 4
(Mid term Exam Schedule) January 2010

Name: _____

Teacher: _____

The following formulas will be needed to complete this exam.

$$x = \frac{-b}{2a}, \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad \text{for } ax^2 + bx + c = 0 \quad \text{only}$$

Part 1

Please circle the correct response for each multiple choice question.

1 Which equation below would be considered a quadratic equation ?

A) $3x^3 - 6x^2 + 7 = 0$

B) $2x^4 + x - 4 = 0$

C) $5x^2 + x + 3 = 0$

D) $2^x - 24 = 40$

2 What is the x -coordinate of the vertex to the quadratic function below?

$$y = -3x^2 - 600x$$

A) -600

B) -100

C) -3

D) 100

3 What is the y -coordinate of the vertex of the quadratic function below?

$$y = -x^2 - 6x$$

A) -9

B) -6

C) -3

D) 9

4 Given the equation $y = 4.9x^2 - 245x$, which direction will the graph open?

A) downward

B) left

C) right

D) upward

5 The quadratic function $y = x^2 + 6x - 1$ has a vertex at $(-3, -10)$. Which statement is true?

- A) the maximum value of $y = -10$ occurs at $x = -3$
- B) the maximum value of $y = 10$ occurs at $x = 3$
- C) the minimum value of $y = -10$ occurs at $x = -3$
- D) the minimum value of $y = 10$ occurs at $x = 3$

6 Which statement is true below concerning $y = ax^2 + bx + c$

- A) if $a > 0$ the graph opens downward
- B) if $a > 1$ then the graph is more wider than $y = x^2$
- C) if $0 < a < 1$, then the graph is more narrow than $y = x^2$
- D) if $0 < a < 1$ then the graph is more wider than $y = x^2$

7 What are the values of x that make $ax^2 + bx + c = 0$ called?

- A) points
- B) roots
- C) thing ama jiggies
- D) y-intercepts

8 Why is it important to know how to solve $ax^2 + bx + c = 0$

- A) you are able to find when $x = 0$
- B) you are able to find where the graph crosses or touches the x-axis
- C) you are able to find where the graph crosses or touches the y-axis
- D) you can find the vertex this way

9 Solve the quadratic equation below by removing the GCF.

$$16x^2 - 20x = 0$$

- A) $x = 0$ $x = 4$
- B) $x = 0$ $x = 5$
- C) $x = 0$ $x = \frac{4}{5}$
- D) $x = 0$ $x = \frac{5}{4}$

10 What are the roots to the quadratic equation below?

$$x^2 - 64 = 0$$

- A) $x = -8, x = 8$
- B) $x = -8$ only
- C) $x = 8$ only
- D) $x = -64, x = 64$

11 Using your knowledge of solving quadratic equations, where would the graph of $y = x^2 - 6x - 7$ cross the x-axis?

- A) $x = -7, x = 0$
- B) $x = -7, x = 1$
- C) $x = -1, x = 7$
- D) $x = 1, x = 7$

12 What are the zeroes to $F(x) = x^2 - 16x$?

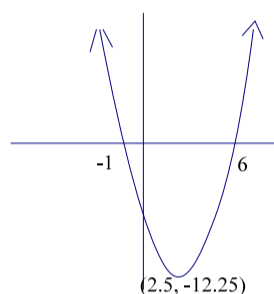
- A) $x = 0, x = -16$
- B) $x = 0, x = 16$
- C) $x = 1, x = -16$
- D) $x = 1, x = 16$

13 What is the expression $4x^2 + 40x + 36$ factored fully?

- A) $4(x - 9)(x - 1)$
- B) $2(2x^2 + 20x + 18)$
- C) $4(x + 9)(x + 1)$
- D) $x^2 + 10x + 9$

14 Given the graph of $y = x^2 - 5x - 6$, what are the roots to $x^2 - 5x - 6 = 0$?

- A) $x = -1, x = -6$
- B) $x = -1, x = 6$
- C) $x = 1, x = 6$
- D) $x = 2.5, x = -12.25$



15 What is the correct process to use to factor the trinomial below by decomposition?

$$4x^2 - 61x + 15 = 0$$

- A) two factors of 15 that have a sum of -61
- B) two factors of -15 that have a sum of +61
- C) two factors of 60 that have a sum of -61
- D) two factors of -60 that have a sum of 61

Part II

1 For $y = -4x^2 + 8x$

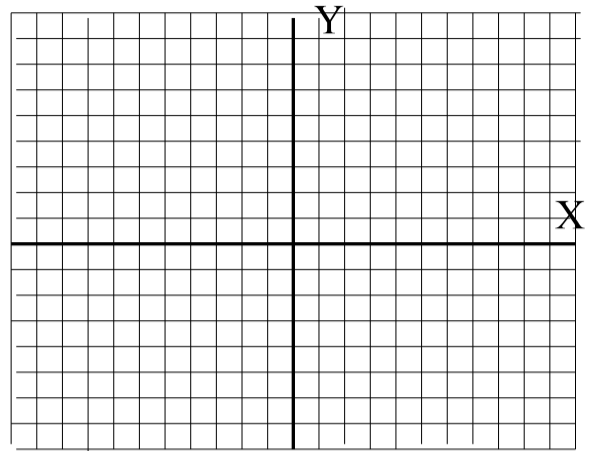
A) Find the vertex (4 marks)

B) Which way does the graph open? _____ (2 marks)

Type of vertex: _____

- C) Using the table, sketch the parabola with its axis of symmetry. (8 marks)

| | |
|-----|------------------|
| x | $y = -4x^2 + 8x$ |
| | |
| | |
| | |
| | |
| | |



- D) State the domain _____ (4 marks)
 State the range _____

- D) Complete: Y has a _____ value of $y =$ _____ and it occurs at $x =$ _____. (3 marks)

2 A farmer wishes to enclose a rectangular field such that he uses one side of river as a side of the rectangle he has 800 m of fencing with which to make this plot.

- A) Draw a diagram to decide how the field would look. (2 marks)

- B) Fill in the table: (10 marks)

| | | | | | |
|---------------|-----------|-----------|-----------|-----------|-----------|
| width | 10 | 20 | 30 | 40 | 50 |
| length | | | | | |
| Area | | | | | |

- C) Show that the relation between the area of the rectangle and its width is a quadratic relationship by finding the second level of differences at D_2 . (3 marks)

- D) Find the equation of the curve of best fit using width as your L1 list and Area as your L2 list. (4 marks)

- E) Use $x = \frac{-b}{2a}$ to find the vertex. Find the dimensions that will yield the largest possible area. What is the maximum area? Use A STATEMENT to answer this question.

(6 marks)

- 3 Determine the roots to the quadratic equations below by factoring. (28 marks)

A) $9x^2 - 18x = 0$

B) $120x - 30x^2 = 0$

C) $36x^2 - 25 = 0$

D) $81 - 100x^2 = 0$

E) $x^2 - 11x + 30 = 0$

F) $4x^2 + 40x + 36 = 0$

G) $x^2 - 17x = -72$

- 4 Use the process of decomposition to factor and solve the quadratic equations below. (12 marks)

A) $3x^2 + 13x + 12 = 0$

B) $4x^2 - 5x - 6 = 0$

- 5 Use the quadratic formula to find the roots to the quadratic equations below. Please give solutions to the nearest tenth if appropriate. (14 marks)

A) $11x^2 - 27x - 16 = 0$

B) $4x^2 + 13x + 1 = 0$

a = _____ b = _____ c = _____

a = _____ b = _____ c = _____

- 6 A cannon ball leaves the muzzle of a cannon and its path follows the graph of quadratic equation. Its equation is $H = -4.9t^2 + 14.7t + 2$ where t is time in seconds and H is the height of the ball in metres.

- A) Using the formula $x = \frac{-b}{2a}$ to find the maximum height reached by the cannon ball. (6 marks)

- B) Use the quadratic formula, to determine when the ball will hit the ground. (Remember to set $h = 0$ as the height is 0 when the ball hits the ground.) (7 marks)

