Mathematics 3204 Name:_____

Assignment 2 (Unit 1 Quadratics)

Review Section 1.1---1.2

1 Determine if the sequence below is arithmetic or quadratic. If the sequence is arithmetic, give a formula for the n^{th} term.

A) {-18, -14, -10, -6, -2 ...

B) {4,0,-12,-32,-60,...}

2 For the quadratic functions below answer the following questions:

$i)\ y = -3x^2 - 12x$ $y = 2x^2 + 10x - 1$

A) What is the orientation of the graph?

B) What are the co-ordinates of the y-intercept?

C) What is the equation standard form?

D) What is the equation in transformation form?

E) What is the mapping rule?

F) What is the vertex/type?

G) What is the range?

3 Find the equation of the following parabolas in standard and transformational form:

A) vertex at (-2,6) and contains the point (5,-2)

B) has an axis of symmetry at x = -8 , contains the point (2,8) and has a minimum y value of y = -6

C) has x intercepts at (-4,0) and (6,0) and has a maximum value of y = 6

4 Algebraically determine the exact roots to the quadratic equations below by:

A) Factoring I) $4x^2–9x = - 5$ (decomposition)

ii $6x + x^2 - 7 = 0$

iii) $4x^2-3x+10=0$

B) Quadratic Formula

I $3x^2 - 6x + 2 = 0$ ii $4x^2 - 11x + 2 = 0$

5 Algebraically determine the roots of the quadratic equations below by a method of your choice. If roots are non-real express them as imaginary numbers in the form of a ± bi.

A) $2x^2 - 7x + 11 = 0$ B) $-5x^2 - x - 3 = 0$

6 Solve for x by cross multiplying and using the quadratic formula.

A) $\frac{2x-3}{3x-1} = \frac{(x-3)}{5x}$ B) $\frac{2}{3+x} = 3x$

7 For the quadratic functions below find:

	$y = -x^2 + 6x - 9$	$y = x^2 - 6x$	$y = 2x^2 - 5x + 10$
the value of the Discriminant			
Nature of the roots			
Number of x-intercepts			

8A) If x = 2 is a root to $x^2 - kx + 10 = 0$ what is the value of k?

B) If x = -4 is a root to $x^2 + 7x + k = 0$ what is the value of k?

Application of Quadratic Functions (Vertex) and Quadratic Equations (Roots)

9 A farmer has 400 meters of fencing with which two build a rectangular fenced region. He plans to use one side of a river bed as a side of the rectangle. Set up a quadratic function and algebraically determine what is the maximum area she can enclose.

10 A rectangular region is 4cm longer than twice its width. Set up a quadratic equation and algebraically determine its width and length if its area is 240 cm^2.

11 Squares 4 cm on a side are cut out of a square sheet of metal at each corner. The sides are then turned up to form an open box. If the volume of the box is 1024 cm^3, set up a quadratic equation to determine what is the original length of each side?

12 A rectangular bin has a base that is 12 m by 5 m wide. Set up a quadratic equation to determine how much must both the length and width be lengthened to increase its floor area by more than double?

13 A golf ball is hit from the top of a tower that is 24 m high. The ball follows a parabolic path defined by the function $y = -5x^2 + 14x + 24$, where x represents the time in seconds since the ball hit, and y represents the height of the ball above the ground in meters. Algebraically determine how long was the ball in the air? What is the maximum height reached by the ball?

14 An object is fired upward vertically from the top of a building at a starting speed of 50m/s. If the building is 40m high, the equation that gives the approximate height h of the object above the ground t seconds after firing is $h = -5t^2 + 50t + 40$.

A) What is the maximum height reached by the object? (Show workings for vertex)

B) When did this occur?

C) Algebraically, how long does it take for the object to hit the ground?

15 Algebraically set up a quadratic equation and determine two consecutive even integers whose product is 1520.

End

Exam Date:=_____