

### Test 1: Number Patterns and Intro to Quadratics

Please read through the test carefully. Please clearly indicate all your work and your solution. **Good luck!**

1. Compare and contrast the differences between arithmetic sequences

	Arithmetic	Quadratic
General form for equation		
Level of common difference		
Value of Common Difference		
Shape of Graph		

2. Determine what type of sequence each of the below are and write a function to find the  $n$ th term.

- a. {2, 7, 12, 17...}
- b. {1, 3, 6, 10, 15, 21...}
- c. {24, 19, 14, 9...}

3. What is the common difference for each of the following functions?

- a.  $t_n = 2n^3$
- b.  $t_n = n^2 + 2$

4. For each parabola:

- i. State the coordinates of the vertex
- ii. State the equation of the axis of symmetry
- iii. State the y-intercept
  - a.  $y = -2(x - 2)^2 + 4$
  - b.  $y = -(x - \frac{1}{2})^2 - \frac{3}{4}$
  - c.  $y = 3(x + 5)^2 - 8$

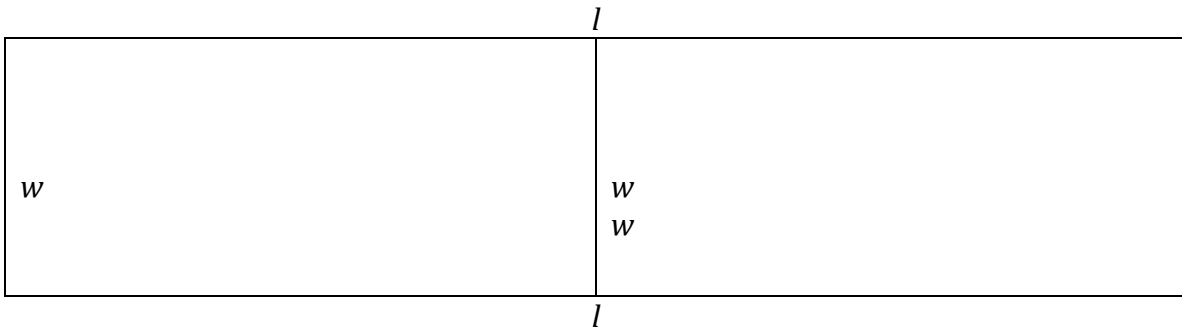
5. Determine the equation of each parabola.

- a. Vertex at (0, 3), passing through (3, 4)
- b. Vertex at (4, 0), y-intercept of 3

6. The height,  $h$  metres, of a batted baseball can be modeled by the function  $h = -2.1(t - 2.4)^2 + 13$  where  $t$  is time in seconds.

- a. What is the maximum height of the ball?
- b. At what time will the ball hit the ground?

7. A rectangular field is to be surrounded with a fence and the enclosed area then divided in half by a fence parallel to one side. There is a total of 300 m of fencing. What is the area for the total enclosed area in terms of one variable? What is the maximum area possible?



8. An airline company transports 500 passengers each day between two cities for a one-way fare of \$60. Research as shown that for each fare increase of \$5, the number of passengers will decrease by 10.

- a. Find an expression to describe the number of tickets sold as a function of selling price.
- b. Express the daily revenue as a function of selling price.
- c. What selling price will provide the maximum revenue? What is the maximum revenue?

9. These graphs were produced by a graphing calculator. The equations of the functions are shown. Identify the function that corresponds to each graph. Justify your choices.