

Name: \_\_\_\_\_  
Student ID: \_\_\_\_\_

## Test 2

This test is graded out of 50 marks. No books, notes, graphing calculators or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work.

### Question 1.

- a. (4 marks) Find the *distance* and the *midpoint* of the line segment joining the points (1, 2) and (6, 3).
- b. (2 marks) Find the equation of the circle whose center is (1, 2) and has a radius of 5.

### Question 2. (4 marks) Use the $x$ and $y$ intercepts to sketch the graph the linear function.

$$5x + 2y = 10$$

**Question 3.** (4 marks) Sketch the graph defined by

$$f(x) = \begin{cases} -x^2 - 1 & \text{if } x \leq 0 \\ \sqrt{x} & \text{if } x > 0 \end{cases}$$

**Question 4.** (4 marks) Find the equation of the line that passes through the point  $(3, 1)$  and is parallel to the line  $x + 3y = 6$ .

**Question 5.** Let  $f(x) = -2x^2 + 3x + 1$  and  $g(x) = \frac{x}{2x+2}$ .

- a. (4 marks) Determine  $\frac{f(x+h)-f(x)}{h}$  and simplify.
- b. (1 marks) Determine the domain of  $g(x)$ .
- c. (2 marks) Determine  $(f \circ g)(x)$  and  $(g \circ f)(x)$ . *Do not simplify.*
- d. (2 marks) Determine  $(g \circ f)(1)$ .
- e. (bonus 1 mark) Determine the range of  $g(x)$ .

**Question 6.** Let  $f(x) = -3x^2 + 5x + 4$ , then find

a. (1 marks)  $f(2)$

c. (3 marks)  $x$  if  $f(x) = 4$

**Question 7.** (1 mark) If  $f(x)$  is injective and  $f(3) = 2$  then find  $f^{-1}(2)$ .

**Question 8.** (4 marks) Find the equation of the line that passes through the point  $(2, 3)$  and  $(4, 7)$ .

**Question 9.** Let  $f(x) = x^2 - 6x + 2$  be a quadratic function.

- a. (2 marks) Determine the vertex of  $f(x)$ .
- b. (1 mark) Determine the orientation of the parabola and state whether the vertex is a minimum or maximum.
- c. (1 mark) Determine the  $y$ -intercept.
- d. (2 marks) Determine the  $x$ -intercept(s).
- e. (1 mark) Sketch the graph of  $f(x)$ .
- f. (1 mark) Determine if  $f(x)$  is injective and justify.
- g. (2 marks) Determine the domain and range of  $f(x)$ .

**Question 10.** (4 marks) If  $f(x) = \frac{x-3}{x-5}$  then find  $f^{-1}(x)$ .

**Bonus.** (4 marks) Find the quadratic function whose graph passes through the points  $(0, 5)$ ,  $(1, 5)$  and  $(-1, 7)$ .