

Name: _____
Student ID: _____

Test 2

This test is graded out of 46 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. If you need more space for your answer use the back of the page.

Formulas:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right) \right)$$

$$h = \frac{-b}{2a} \quad k = \frac{4ac - b^2}{4a}$$

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

- (1 mark) Evaluate $g(3)$.
- (2 marks) Evaluate $f(x+h)$ and simplify.
- (2 marks) Simplify $\frac{f(x+h)-f(x)}{h}$.
- (2 marks) Evaluate $(g \circ f)(x)$.
- (1 mark) Evaluate $(g \circ f)(2)$.
- (bonus 1 mark) Determine the domain of $g(x)$.

Question 2. Let $f(x) = x^2 + 6x + 5$ be a quadratic function.

- a. (3 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. (3 marks) Determine the x -intercept(s).
- e. (2 marks) Sketch the graph of $f(x)$.
- f. (bonus 1 mark) Determine the range of $f(x)$.

Question 3. The 'Clever Company' company make t-shirts with the slogan "Mathemagical". They sell the t-shirt to the hipsters for 25\$ each. The fixed cost for making the t-shirts is 200\$ and a variable cost of 15\$ for each t-shirt (*since the t-shirts are fair trade*).

- a. (1 mark) Determine the revenue function, $R(x)$.
- b. (1 mark) Determine the cost function, $C(x)$.
- c. (2 marks) Determine the profit function, $P(x)$.
- d. (3 marks) Determine the break-even point and discuss its meaning.
- e. (bonus 1 mark) Determine the marginal profit and discuss its meaning.

Question 4. Brittany and Giuseppe have determined the demand and supply function for the t-shirts sold by the 'Clever Company', while playing cards in the back of their class: demand: $2p + q = 240$
supply: $2p - 9q = 10$

- a. (4 marks) Determine the market equilibrium.
- b. (1 mark) Determine the q and p intercepts of the demand function.
- c. (1 mark) Determine the q and p intercepts of the supply function.
- d. (3 marks) Sketch the graph of the demand, supply function and label the market equilibrium.

Question 5. (4 marks) Yann buys a laptop for 1700\$ and the laptop is worthless after 5 years. If the laptop's value depreciates linearly, find the function that describes the depreciation. After what period of time will the laptop be worth 1000\$?

Question 6. Solve for x

a. (3 marks) $x^2 - 2x - 2 = 0$

b. (5 marks)

$$1 = \frac{35}{x-4} - \frac{35}{x}$$