

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

## Test 3

This test is graded out of 47 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:**

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad \left( \frac{-b}{2a}, f\left(\frac{-b}{2a}\right) \right) \quad h = \frac{-b}{2a} \quad k = \frac{4ac - b^2}{4a}$$
$$I = Prt \quad S = P + I = P(1 + rt)$$
$$S = Pe^{rt} \quad FV = PV \left( 1 + \frac{j}{m} \right)^{mt}$$

**Question 1.** Emma loans \$1100 for 200 days to Ba Jin at a rate of 2.25% per year.

- (2 marks) How much interest does Ba Jin owe Emma?
- (2 marks) What is the future value of the loan?

**Question 2.** (4 marks) What interest will be earned if \$9 000 is invested for 255 days at 4% compounded continuously.

**Question 3.** (9 marks) Sketch the graph of  $f(x) = 3^x$ ,  $g(x) = \log_3(x)$  and  $y = x$  on the same cartesian plane.

**Question 4.** (4 marks) How long (*in years*) would \$16 000 have to be invested at 6%, compounded monthly, to amount to \$55 400.

**Question 5.** (4 marks) A sum of \$5 000 would have to be invested at what interest rate to amount to \$6 000 in 9 months.

**Question 6.**

- a. (4 marks) Express the logarithms as a single logarithm with a coefficient of one.

$$\frac{1}{2} \log(x+1) + 2 \log(x+3) - 3 \log(x+2)$$

- b. (2 marks)  $\log_9 3$

- c. (3 marks) Solve for  $x$ .

$$\log(4+4x) = 3$$

**Question 7.** Let  $C(x) = 3200 + 1500x$  be the cost function and  $R(x) = 1700x - 2x^2$  be the revenue function.

- a. (1 mark) Find the profit function,  $P(x)$ .
- b. (4 marks) Find the break-even point.
- c. (4 marks) Find the number of items sold that maximize the profit function and find the maximum profit.

**Question 8.** (4 marks) What amount needs to be invested in order to have \$2 200 in 99 days at a rate of 5.4% compounded daily.