

PART A - CALCULATOR ACTIVE Answer in the space provided. Show all formulas and list all given information for partial credit. (30 marks)

1. Approximate  $\log_{\pi} e$  to three decimal places:

/1

2. What is the pH of a solution whose hydrogen ion concentration is  
a)  $10^{-4}$  mol/L?                      b) 0.0432 mol/L?

/3

3. How many times more intense is an earthquake measuring 7.8 on the Richter scale than one measuring 6.1?

/2

4. What is the annual percentage rate (of interest) if \$1080 grows to \$1693.78 after 9 years, where the interest is compounded continuously?

/3

5. What is the (a) present value and (b) future value of an annuity after investing periodic payments of \$2000 for 15 years at an annual interest rate of 8% compounded quarterly?

/5

6. How many more days (to the nearest day) will it take to triple an investment with 8% interest rate compounded quarterly versus compounded daily?

/5

7. Sara repays a loan to the bank monthly over 4 years at an annual interest rate of 12%. The total amount that she ends up repaying the bank is \$18 366.78. How much money did Sara initially borrow from the bank?

/5

8. A cake is removed from an oven at  $350^{\circ}$  F and it cools to  $120^{\circ}$  F after 20 minutes in a room at  $65^{\circ}$  F.
- How long will it take the cool to  $90^{\circ}$  F?
  - Why is this answer flawed?

/6

PART B - NO CALCULATOR

(15 marks)

9. Solve for  $x$ :

$$\begin{array}{l} / \\ 10 \end{array} \quad \text{a) } \frac{e^x - e^{-x}}{2} = 5$$

$$\text{b) } \log 1 - \log(x+2) - \log(x-2) = 0$$

$$10. \text{ Determine the domain of } y = \frac{\ln(2-x)}{e^{-x}}.$$

$$\begin{array}{l} / \\ 2 \end{array}$$

$$11. \text{ Determine the value of } a, \text{ such that } g^{-1}(x) = \log_a(-x) \text{ and } g(-3) = -8.$$

$$\begin{array}{l} / \\ 3 \end{array}$$