

MCV4U UNIT 4 Exponential and Trig

Name: _____

Date: _____

Knowledge (24)	Application (24)	Communication (13)
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Show ALL work for full marks.

- You open your newspaper and see 3 different ads from 3 different banks regarding investments and interest rates. Which of these should you invest in? How much more could you make after 2 years? Show supporting calculations. [9KA 3C]
 - 3.17% interest rate, compounded monthly
 - 3.2% yearly interest rate
 - 3.16% interest rate, compounded continuously

- Find the derivative of the following function using the $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ Show all your steps. [3A 2C]

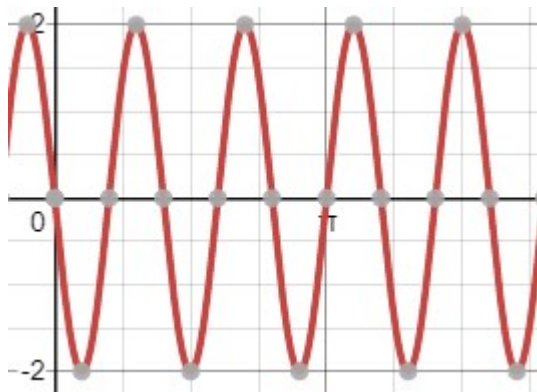
$$f(x) = e^{4x}$$

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3. A strain of bacteria has a tripling time of 38 minutes. If we started off with 2000 bacteria.
- a. Find an expression USING THE NATURAL EXPONENTIAL for the amount of bacteria we will have after t minutes. [3KA 2C]
- b. How many bacteria will we have after 3.5 hours? [3K 1A 2C]
- c. At what time will there be 10800 bacteria? [3K 1A 1C]
- d. What is the rate of growth at a time of 4 hours? You may use your knowledge of what the equation for the change in growth rate should be [3A 1C]

4. Below are two graphs of trigonometric functions. **Analyze** the function and, along with your knowledge of the derivatives of trigonometric functions, determine the derivative of each function. You DO NOT need to graph the function. [3K 2A 1C each]

a)



b)

