

Name _____

You must show all of your work to receive credit for a correct answer. You are not allowed to borrow another student's calculator during the quiz.

1. (5 points) The Nike company manufactures and sells a new type of running shoe. The total manufacturing costs to Nike consist of fixed costs of \$250,000 plus production costs of \$35 per pair of shoes. Each pair of shoes is sold for \$75. Let q denote the number of pairs of shoes produced.

(a) Give formulas for the cost function $C(q)$ and the revenue function $R(q)$ for this new shoe.

(b) If Nike produces and sells 5,000 pairs of these shoes, do they earn a profit or suffer a loss? How much (in dollars) is the amount of this profit or loss?

(c) Exactly how many pairs of shoes must be produced and sold in order for Nike to break even?

2. (3 points) Alice is normally only 4 feet tall, but after drinking liquid from a strange bottle, she started to grow **exponentially**. Her height is shown in the table below, where t is the number of minutes since she first drank from the bottle, and h is her height in feet.

t	h
0	4
1	4.4
2	4.84
3	
4	

- (a) Complete the table by filling in the two missing entries.
- (b) Find a formula for Alice's height h as a function of t .
- (c) How long does it take for her height to double in value? For full credit, be sure that your answer is accurate to at least one place after the decimal point.

3. (2 points) Suppose that y is an exponential function of x , and that its graph goes through the points $(0, 512)$ and $(3, 216)$. Find an exact formula for y in terms of x .