Math 157 - Quiz 1

August 26, 2015

Name __key__

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (2 points) Let $f(x) = x^2 - 3x + 5$. Find the slope of the graph's secant line through the points where $x = 2$ and $x = 4$.

$$\frac{f(4) - f(2)}{4 - 2} = \frac{[4^2 - 3(4) + 5] - [2^2 - 3(2) + 5]}{4 - 2}$$

$$= \frac{9 - 3}{4 - 2} = \frac{6}{2} = \boxed{3}$$

2. (2 points) Suppose that $C(t)$ represents the cost (in dollars) for hiring a consultant for t hours. If you solved the equation $C(t) = 200$, what would be the meaning (or significance) of your solution? (Use units when answering.)

IF $C(t) = 200$, THEN t REPRESENTS THE NUMBER OF HOURS THE CONSULTANT WOULD WORK FOR $200.

3. (2 points) Could this data be representative of a linear function? Show work.

x	1	3	6	8	9
y	-5	1	10	16	20

$$\frac{-5 - 1}{1 - 3} = \frac{-6}{-2} = 3$$

$$\frac{1 - 10}{3 - 6} = \frac{-9}{-3} = 3$$

$$\frac{10 - 16}{6 - 8} = \frac{-6}{-2} = 3$$

$$\frac{16 - 20}{8 - 9} = \frac{-4}{-1} = 4$$

CANNOT BE LINEAR.

RATE OF CHANGE IS NOT CONSTANT.

4. (4 points) Annual sales of music CDs have declined since 2000. Sales were 942.5 million in 2000 and 384.7 million in 2008.

(a) Find a formula for the annual sales, S, in millions of CDs, as a linear function of the number of years, t, since 2000.

$(0, 942.5)$

$(8, 384.7)$

$m = \dfrac{384.7 - 942.5}{8} = \dfrac{-557.8}{8} = -69.725$

$$\boxed{S(t) = -69.725t + 942.5}$$

(b) Use your function to predict CD sales in 2017.

$S(17) = -242.825$

↑ A NEG NUMBER OF CDS IS

ACTUALLY NOT POSSIBLE

(c) Solve the equation $S(t) = 0$. What is the significance of your solution? (Use units when answering.)

$S(t) = 0 \Rightarrow -69.725t + 942.5 = 0$

$\Downarrow$

$t = \dfrac{942.5}{69.725} \approx 13.517$

AFTER ABOUT 13.5 YEARS SALES

SHOULD BE AT THE LEVEL OF ZERO.

FOR THIS REASON IT IS NOT

SURPRISING THAT $S(17)$ IS NEG.

(SEE PART b)