MATH 422 **Week 14 Quiz** **Name**_____
Date_____

Directions: Answer each question to the best of your ability. **Show your reasoning** and/or process used to answer the question(s) where it is appropriate. A calculator will be necessary for this quiz. You are not permitted to use a device that has internet capability. Not all questions are worth the same number of points. Please look at point values. Total points = 15.

1. (2 pts)

If $f(x) = 4x^2 - 2x - 35$, find $f'(x)$. Then find the slope of the curve at x = -3

2. (4 pts)

The total cost (in dollars) to produce q units of a good is given by the function:

$$C(q) = 0.003q^2 + 6.9q + 43000$$

A. What is the total cost to produce $q = 7200$ units?

Total cost = $

B. What is the marginal cost function?

C. If 7200 items have already been made, what is the cost of making the *next* item?

Cost of the $next$ item = $

D. What is the correct interpretation for the marginal cost?

A. When 7200 units are produced, the cost of additional units is approximately $50 per unit.
B. The average cost to make 7200 units is about $50 per unit.
C. When 7200 units are produced, it cost $43,000 plus the fixed cost to make them.
D. When the marginal cost is $50, we conclude that 7200 units are produced at that price.

3. (4 pts)

The cost of producing q units of stuffed alligator toys is $C(q) = 0.002q^2 + 10q + 6000$

A. Fill in the table at the right:

B. What is the *fixed cost* for producing these toys?

C. What is the *average cost* for producing each toy if 750 toys are made?

D. If 750 toys were made, how much would it cost to produce one more toy?

Quantity (q)	Total cost (C)
0	
250	
500	
750	
1000	

4. (2 pts)

Suppose a product's revenue function is given by $R(q) = -5q^2 + 800q$, where $R(q)$ is in dollars and q is units sold. Find the marginal revenue at 35 units.

$MR(35) =$

5. (3 pts)

Suppose a demand function is given by $p = D(q) = -0.0007q^2 + 90$, where q is <u>thousands of units</u> produced and $D(q)$ is market price in dollars for a barrel of crude oil. Compute the following, showing all calculations clearly.

A) Write a formula for revenue as a function of q (quantity):

R(q) =

B) Given that $R'(q) = -0.0021q^2 + 90$ and current production is at 200,000 barrels, how much revenue loss would there be to increase production to 201,000? (from q = 200 to q = 201)

C) According to this model, what is the price of crude oil when production is at 200,000 barrels?

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Key - Form 1

1. $8x - 2$
2. $9x^8 \sim -21x^6 \sim -\frac{4}{x^5}$
3. $60x^9 + 56x^7$
4. -36
5. $\frac{1}{7}x^{-\frac{6}{7}}$
6. $\frac{4}{x}$
7. -21 ~ -21 ~ -23
8. $1 \sim 2$
9. $92680 \sim 6.9$
10. $338 \sim 12000 \sim 22.108$
11. $10092 \sim 4116 \sim 5976$
12. $-\frac{1}{2500}q + \frac{88}{5}$
13. $-16q + 1000$
14. 450
15. 12
16. 63
17. 11500 ~ 11512.002 ~ 12.002 ~ 12 ~ A: When 500 units are produced, the cost of additional units is approximately 12 per unit.
