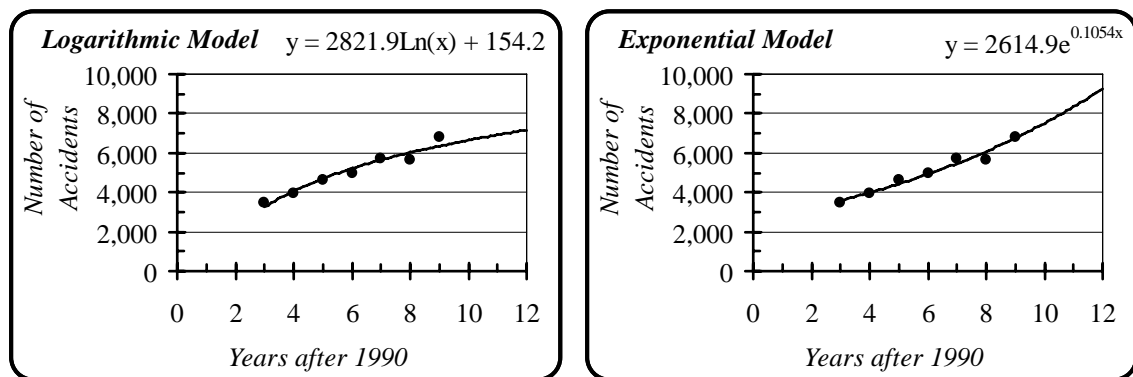


Business Mathematics II
Project 1: Marketing Computer Drives
STUDY GUIDE FOR FINAL EXAM

Questions 1–11 refer to the following data. The manager of a small city has records of the numbers of injury automobile accidents in the town during the past few years.

Year	1993	1994	1995	1996	1997	1998	1999
Number of Accidents	3,447	3,978	4,652	4,978	5,732	5,667	6,795

The manager used *Excel* to fit both logarithmic and exponential trend lines to the data. (In the logarithmic trend line, $\text{Ln}(x)$ stands for the natural logarithm of x . This would be denoted by **LN(x)** in *Excel*.)



1. Use the formulas to create a single *Excel* plot showing both the logarithmic and exponential trend lines over the interval from 3 to 14 years after 1990.
2. Use **Graphing.xls** to plot (i) the logarithmic trend line and (ii) the exponential trend line over the interval from 3 to 14 years after 1990. (You will have two separate graphs.)
3. Use the logarithmic equation to predict the number of injury automobile accidents in 2002.
4. Use the exponential equation to predict the number of injury automobile accidents in 2002.
5. Use the logarithmic equation to estimate the number of injury automobile accidents in 1991.
6. Use the exponential equation to estimate the number of injury automobile accidents in 1991.
7. Are either or both of the estimates in *Questions 5* and *6* reasonable?
8. Use the exponential equation to predict the number of injury automobile accidents in 2040.

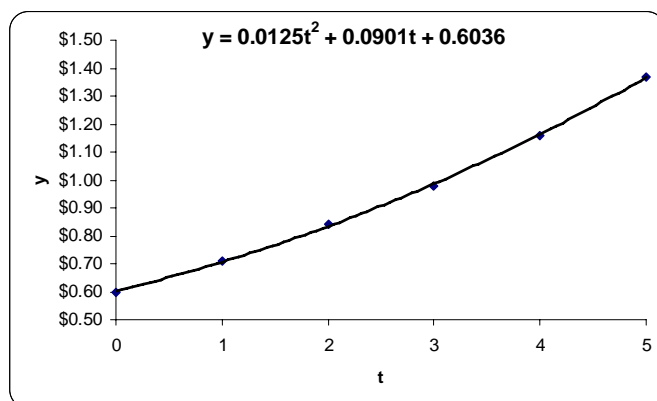
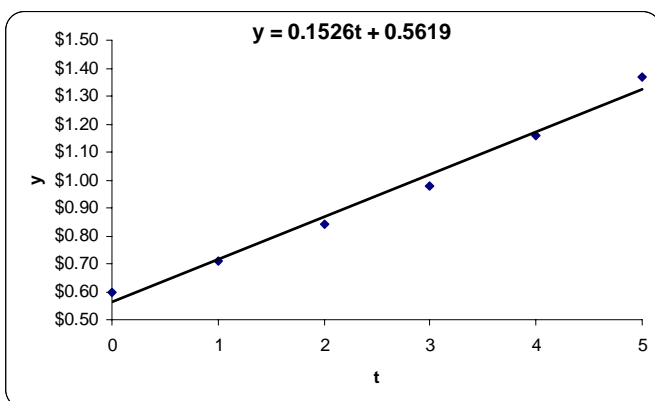
9. In real world terms, why or why not would you use your prediction from *Question 8* in future planning?
10. In real world terms, why or why not would you use your prediction from *Question 4* in future planning?
11. Which model would you use in city planning? Why?
12. The table given below shows the closing price of Microsoft Corporation's common stock at the end of each of the first six months of 2001.

Month	Jan	Feb	Mar	Apr	May	Jun
Closing Price	\$61.00	\$59.00	\$54.70	\$67.80	\$69.20	\$73.00

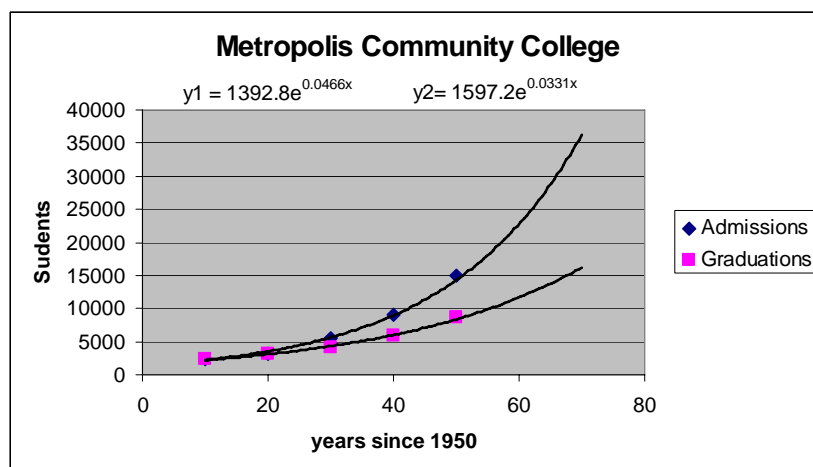
The equation of the trend line is given by $y = -0.6 \cdot t^3 + 7.1 \cdot t^2 - 22.3 \cdot t + 77.4$, where t represents the number of months after December 31, 2000.

- (a) Use the equation to predict the closing price of Microsoft Corporation's common stock at the end of July 2001.
- (b) Given that the actual closing price at the end of July 2001 was \$66.19, does the prediction in Part (a) seem reasonable?
- (c) Use the equation to predict the closing price of Microsoft Corporation's common stock at the end of December 2002.
- (d) In real world terms, why or why not should the prediction in Part (c) be used in future planning?

13. The plots given below show the cash flow per share for the Coca-Cola Company from 1990 through 1995. (The variable t represents the number of years after 1990.) A linear trend line is displayed in the first plot, and a quadratic trend line is displayed in the second plot.



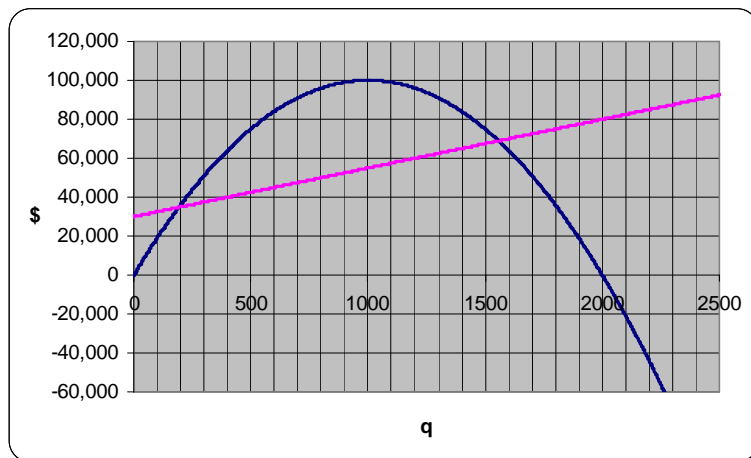
- (a) Use the linear trend line to predict the cash flow per share in 2005.
 (b) Use the quadratic trend line to predict the cash flow per share in 2005.
 (c) Which estimate appears to be more reliable? Explain.
14. The chart below was produced for the regents of Metropolis Community College. It was generated using *Excel* to plot and generate exponential trend lines for the number of students admitted and the number of students graduating from MCC.



- (a) Estimate the number of admissions in 1965.
 (b) Estimate the number of students who graduated in 1965.
 (c) Predict the number of students who will graduate in 2010.
 (d) The regents of MCC are very concerned with a trend that this chart shows between 1960 and 2000. Why?
 (e) Predict the number of admissions in the year 2050. Should the regents make plans based on that number?

15. Consider a good whose demand function is $D(q) = 200 - 0.2 \cdot q$. The fixed cost for producing the good is \$20,000 and it costs \$50 to produce each unit of the good.
- (a) What price should we put on a unit if we want to sell 600 units?
 - (b) How many units can we expect to sell at a price of \$120?
 - (c) What is the maximum price at which any unit of the good can be sold?
 - (d) Find an equation for the revenue function of the good. What revenue would result from the sale of 600 units at the price that would produce exactly 600 sales?
 - (e) Find an equation for the total cost function of the good. What is the total cost of producing 600 units?
 - (f) How many units of the good can be produced for a total cost of \$35,000?
 - (g) Find an equation for the profit function of the good. What profit would result from the sale of 500 units at the price which would produce exactly 500 sales?
 - (h) Suppose you know that the marginal profit is given by $MP(q) = 150 - 0.4 \cdot q$. Use this to find the number of units that should be sold in order to maximize profit.
 - (i) How should the good be priced in order to maximize profit? What maximum profit can be expected from sales of the good?
 - (j) Use a difference quotient with $h = 0.001$ to approximate the marginal revenue when 300 units are being sold.
 - (k) Use ***Integrating.xls*** to compute the consumer surplus at the production level that maximizes profit. Can you compute the consumer surplus without the use of integration?
16. The demand function for a product is given by $D(q) = -0.0006 \cdot q^2 - 0.002 \cdot q + 450$, fixed costs are \$50,000, and the marginal cost is \$75 per unit.
- (a) What price per unit would result in the sale of 500 units?
 - (b) What revenue would result from the sale of 500 units at the price that would produce exactly 500 sales?
 - (c) Find a formula for the consumer surplus when 500 units are produced and sold.
 - (d) How much would it cost to product 500 units of the product?
 - (e) What profit would result from the sale of 500 units at the price that would produce exactly 500 sales?

17. Graphs of the revenue and cost functions for a product are given below.

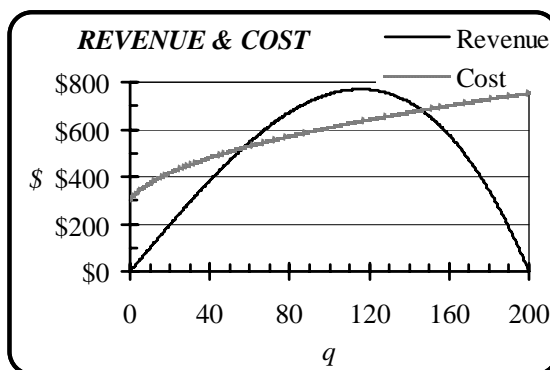
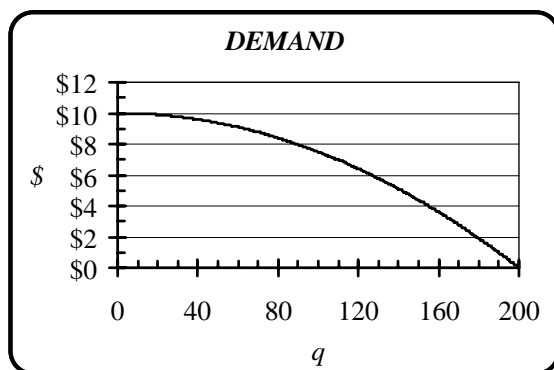


- Estimate the number of units that should be produced in order to maximize revenue.
- Estimate the maximum possible revenue.
- Estimate the number of units that should be produced in order to maximize profit.
- Estimate the maximum possible profit.

18. The demand function for a product is given by $D(q) = -0.0005 \cdot q^2 + 80$.

- Find the number of units that would be sold at a price of \$60 per unit.
- Find the revenue that would result from the sale of the product at a price of \$60 per unit.
- Find a formula for the consumer surplus when the product is sold at a price of \$60 per unit.

19. The demand, revenue, and cost functions for the production of a good are plotted below.



- How many units can the company expect to sell at a price of \$6 per unit?
- Estimate the largest number of units that would yield a positive profit.
- What price should be put on each unit of the good in order to maximize revenue?
- Estimate the company's maximum profit.

20. The fixed cost for a product is \$100,000 and the marginal cost is \$180 per unit.

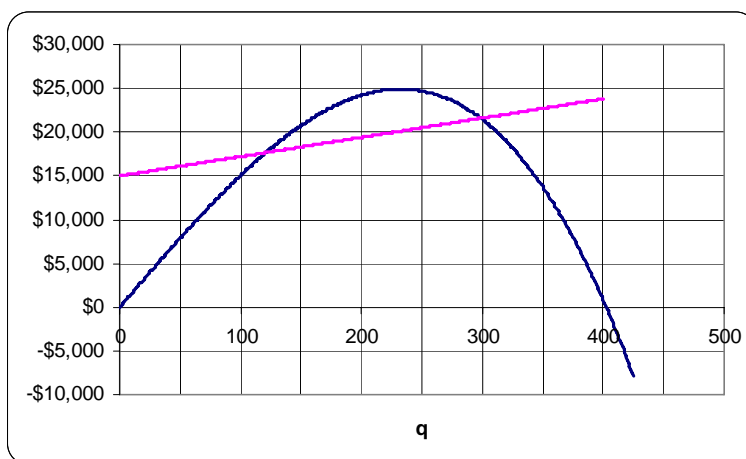
- Find the formula for the total cost function for this product.
- What is the total cost for producing 1500 units of this product?
- How many units could be produced for a total cost \$275,500?

21. The demand function for a product is given by $D(q) = -0.0005 \cdot q^2 + 80$.

- Find the largest possible quantity that could be sold.
- Fill in the information that would be needed in order to use *Integrating.xls* to plot $D(q)$ and to estimate the total possible revenue.

Definition	Computation		Plot Interval		Integration Interval		$\int_a^b f(x) dx$
Formula for $f(x)$	x	$f(x)$	A	B	a	b	
=		=					

22. Graphs of the revenue and cost functions for a product are given below.



- Approximately what is the fixed cost for the product?
- Approximately what is the total variable cost for producing 225 units?
- Approximately what revenue would result from the sale of 225 units?
- Approximately what profit would result from the sale of 225 units?

23. The profit and marginal profit functions for a product are given by

$$P(q) = -0.05 \cdot q^2 + 55 \cdot q - 5000 \text{ and } MP(q) = -0.1 \cdot q + 55, \text{ respectively.}$$

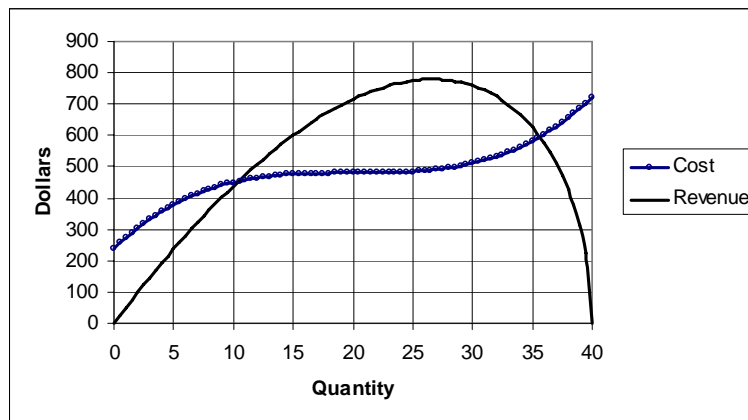
- On what interval is $R(q) \geq C(q)$?
- On what interval is $MR(q) \geq MC(q)$?

24. A company estimates that the demand function for its product is given by

$D(q) = -0.0002 \cdot q^2 + 100$, that fixed costs are \$10,000, and that variable costs are \$20 per unit.

- (a) Find the price at which 300 units could be sold.
- (b) Find the revenue that can be expected from the sale of 300 units.
- (c) Find the formula for the consumer surplus when 300 units are produced and sold.
- (d) Find the total cost of producing 300 units.
- (e) Find the profit that can be expected from the sale of 300 units.

25. The graphs below represent the cost and revenue for a particular product.

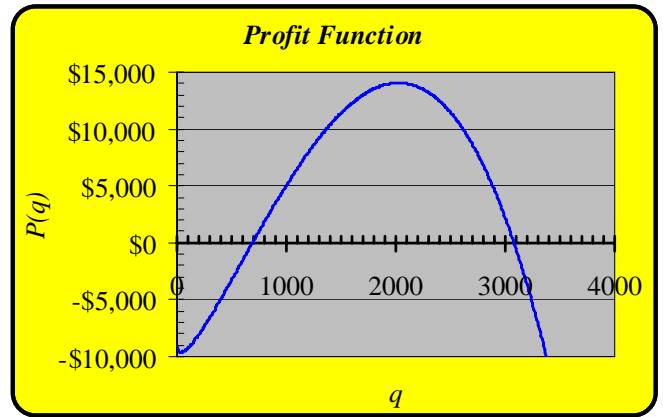
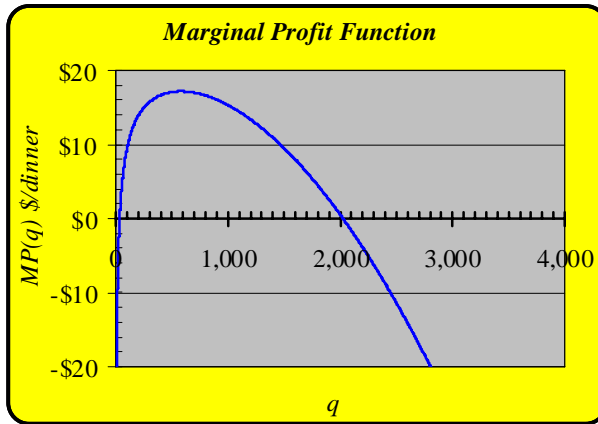


Use the graphs to estimate

- (a) The number of units that need to be sold so that the profit is zero.
- (b) The fixed costs.
- (c) The number of units that need to be sold to maximize profit.
- (d) The maximum profit.
- (e) The revenue where the marginal revenue function is equal to zero.

26. Answer the following questions using the graphs of the profit and marginal profit functions given below.

- Over what interval is $R(q) > C(q)$?
- Over what interval is $MR(q) > MC(q)$?
- For what quantity q does $MR(q) = MC(q)$?
- At what quantity q is the profit maximized?



27. A company manufactures and sells a special type of watch. Suppose the demand function is $D(q) = 56 \cdot e^{-0.012 \cdot q}$ measured in dollars with q measured in watches. Assume that the function is only valid for $0 \leq q \leq 200$.

- Find $D(50)$ and give a business interpretation of your answer.
- If the company sells the watch for $D(50)$, write an expression to find the potential revenue lost because $D(50)$ is too high.
- Estimate the number of watches sold when the price of the watch is \$40.
- Sketch a graph of $D(q)$, and use it to illustrate $R(20)$.

28. Your company has invented an improved red rubber clown nose. (These have better fit, ventilation, and longer lasting color.) The fixed costs of production total \$11,000, and each clown nose costs an additional \$5 for materials and labor.

- Find the formula for $C(q)$, where q is the number of clown noses produced.
- Find the formula for $MC(q)$.
- The marginal revenue is given by $MR(q) = -0.02 \cdot q + 150$. Use this and your answer to Part (b) to find the quantity q which maximizes the profit.

29. Each of the following statements implies one or more of the listed algebraic equations. For each of the statement, list the letter(s) of all corresponding equations

- (i) Profit is maximized when 500 units are produced.
- (ii) Above a price of \$500 no units are sold.
- (iii) 500 units is a break-even point.

- A. $P(500) = 0$.
- B. $MP(0) = 500$.
- C. $MR(500) = MC(500)$.
- D. $D(0) = 500$.
- E. $D(500) = 0$.
- F. $R(500) = 0$.
- G. $R(500) - C(500) = 0$.
- H. $P(q) = 500$.

30. The fixed costs for a particular good are \$25,000. It costs \$130 to produce the first 700 units of the good and it costs \$95 to produce any unit after that. Enter below the information you would use in **Graphing.xls** to graph the cost function.

Definition	
Formula for $f(x)$	
	=

Computation	
x	$f(x)$
	=

Plot Interval	
a	b

Constants	
s	
t	
u	
v	
w	

31. Which of the following is/are true of consumer surplus?

- (i) It is the derivative of the demand function.
 - (ii) It is the integral of the demand function.
 - (iii) It is a part of the area under the graph of the demand function.
 - (iv) It is the excess of revenue over cost.
 - (v) None of the above.
- (A) (i) only
 - (B) (iii) only
 - (C) (v) only
 - (D) (ii) and (iii) only
 - (E) (iii) and (iv) only

32. Which of the following is/are true of the cost function?

- (i) It never decreases as quantity increases.
- (ii) It is never less than the fixed cost.
- (iii) It is never greater than the revenue function.
- (iv) It is necessary for calculating profit.
- (v) It is necessary for determining the demand function.

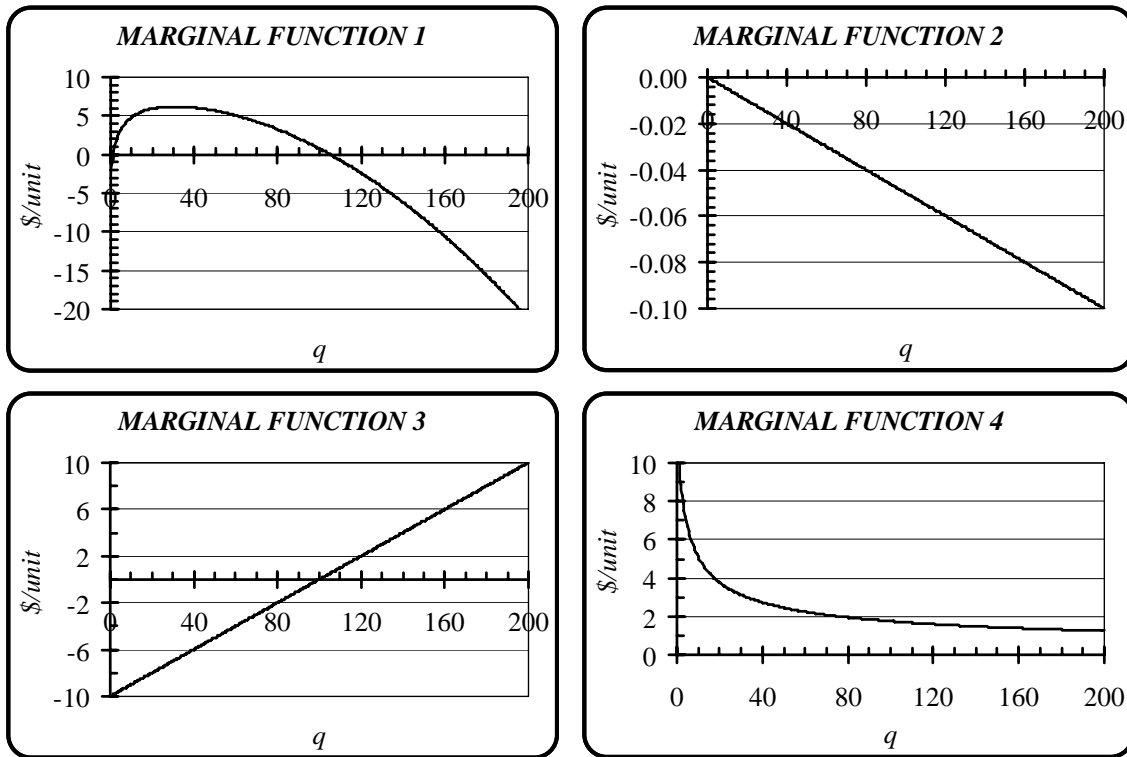
- (A) (i) only
- (B) (ii) only
- (C) (i), (ii), and (iii) only
- (D) (i), (ii), and (iv) only
- (E) (i), (ii), and (v) only

33. In order to determine the demand function, which of the following is/are necessary?

- (i) Data showing the relationship between cost and quantity.
- (ii) Data showing the relationship between price and quantity.
- (iii) Data showing the relationship between revenue and quantity.

- (A) (i) only
- (B) (ii) only
- (C) (iii) only
- (D) (i) and (ii) only
- (E) (i) and (iii) only

34. The plots of four marginal functions for the production of a good are shown below.



- Marginal Function ___ is marginal demand.
- Marginal Function ___ is marginal cost.
- Marginal Function ___ is marginal profit.
- At what production level, q , are the variable costs equal to \$2 per unit?

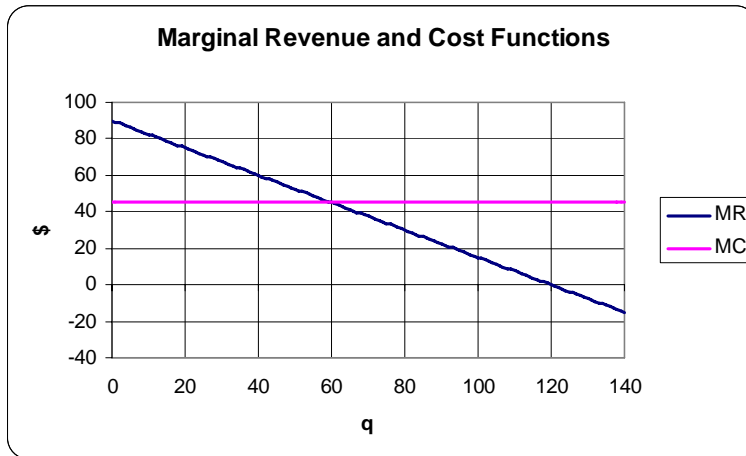
35. The marginal revenue and cost functions for a product are $MR(q) = -0.075 \cdot q + 150$ and $MC(q) = 45$, respectively.

- Is the revenue function increasing or decreasing at $q = 1000$? Explain.
- Is the profit function increasing or decreasing at $q = 2000$? Explain.
- For what value of q is revenue maximized? Explain.
- For what value of q is profit maximized? Explain.

36. The marginal revenue and marginal cost functions for a product are given by $MR(q) = -0.0075 \cdot q^2 + 300$ and $MC(q) = 225$, respectively.

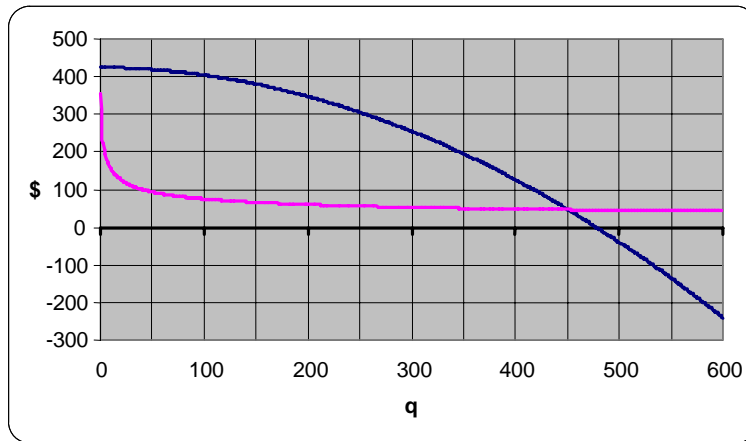
- (a) Is the revenue function increasing or decreasing at $q = 50$? Explain.
- (b) How many units should be produced and sold in order to maximize revenue?
- (c) Is the profit function increasing or decreasing at $q = 150$? Explain.
- (d) How many units should be produced and sold in order to maximize profit?

37. Graphs of the marginal revenue and cost functions for a product are given below.



- (a) Is $R(q)$ increasing or decreasing at $q = 100$ units? Explain.
- (b) Is $C(q)$ increasing or decreasing at $q = 100$ units? Explain.
- (c) Is $P(q)$ increasing or decreasing at $q = 100$ units? Explain.
- (d) Approximately how many units should be produced and sold in order to maximize revenue?
- (e) Approximately how many units should be produced and sold in order to maximize profit?

38. Graphs of the marginal revenue and marginal cost functions for a product are given below.



- (a) Is the revenue function increasing or decreasing at $q = 200$?
 - (b) Is the cost function increasing or decreasing at $q = 200$?
 - (c) Is the revenue function increasing or decreasing at $q = 500$?
 - (d) Is the cost function increasing or decreasing at $q = 500$?
 - (e) Is the profit function increasing or decreasing at $q = 250$?
 - (f) For what value of q is profit maximized?
 - (g) For what value of q is revenue maximized?
39. The demand function for a product is $D(q) = -2 \cdot q^2 + 60$. Use a difference quotient with $h = 0.001$ to estimate the marginal demand when 5 items are produced.
40. The marginal revenue and marginal cost functions for a good are $MR(q) = -0.4 \cdot q + 500$ and $MC(q) = 250$, respectively.
- (a) Is $R(q)$ increasing or decreasing at $q = 600$? Explain.
 - (b) Is $C(q)$ increasing or decreasing at $q = 1000$? Explain.
 - (c) Is $P(q)$ increasing or decreasing at $q = 800$? Explain.
 - (d) How many units should be produced and sold in order to maximize revenue?
 - (e) How many units should be produced and sold in order to maximize profit?
41. If $MC(q) = -0.04 \cdot q + 120$, calculate the cost of producing an extra item when 80 items have been produced.

42. Suppose that for a certain kind of product, revenue $R(1,200) = \$30,000$, cost $C(1,200) = \$23,000$, marginal revenue $MR(1,200) = \$400$, and marginal cost $MC(1,200) = \$100$. Due to a change in the economy, the revenue function decreased by \$5,000, and cost increased by 10%. Find the profit and the marginal profit under new economic conditions if 1,200 items are produced.
43. The cost of producing a new type of sunglasses is given by $C(q) = 40,000 + 70q$, and the marginal revenue is $MR(q) = -0.001q + 150$.
- (a) What is the quantity that maximizes the profit?
(b) An investment in new equipment resulted in a 15% reduction in marginal costs. The cost of the new equipment was \$9,000. Find the new quantity of sunglasses that would maximize profit.
44. Let $f(x) = 4/x$. Use a difference quotient with an increment of $h = 0.00001$ to approximate $f'(2)$.
45. Let $f(x) = \frac{5x}{x+1}$.
- (a) Use a difference quotient with an increment of $h = 0.01$ to estimate $f'(4)$.
(b) Find the equation of the line that is tangent to the graph of $f(x) = \frac{5x}{x+1}$ at $x = 4$.
(c) Let $g(x) = -2 \cdot f(x) + 8$. Use the result from Part (a) to estimate $g'(4)$.
46. Let $f(x) = 0.75^x + 2$.
- (a) Use a difference quotient with an increment of $h = 0.001$ to approximate $f'(5)$.
(b) Use the result from Part (a) to find the equation of the line that is tangent to the graph of $f(x)$ at $x = 5$.
47. Let $f(x) = 1.5^x - 1$.
- (a) Use a difference quotient with an increment of $h = 0.001$ to estimate $f'(4)$.
(b) Find the equation of the line that is tangent to the graph of $f(x) = 1.5^x - 1$ at $x = 4$.
(c) Use the result from Part (a) to estimate the derivative of $g(x) = 0.5 \cdot f(x) + 0.75$ at $x = 4$.
48. If $f'(x) = m$, where $m \neq 0$ is a constant, what does this tell you about the graph of $f(x)$?

49. Let $f(x)$ and $g(x)$ be differentiable at $x = -2$, and suppose that $f(-2) = 3$, $g(-2) = 10$, $f'(-2) = -4$, and $g'(-2) = -1$. Consider the functions $h(x) = 2 \cdot f(x) - 3 \cdot g(x)$, $k(x) = 5x + g(x)$, and $l(x) = f(x) - 10$. Evaluate

- (a) $h'(-2)$.
- (b) $k'(-2)$.
- (c) $l'(-2)$.
- (d) $h(-2)$.

50. Let $f(x) = \frac{x^2}{50+x}$.

- (a) Use a difference quotient, with an increment of $h = 0.001$ to estimate $f'(20)$.
- (b) Use the result from Part (a). to find the equation of the line that is tangent to the graph of

$$f(x) = \frac{x^2}{50+x} \text{ at } x = 20.$$

- (c) Let $g(x) = \frac{-30 \cdot f(x) + 85}{25}$. Use the result from Part (a) to estimate $g'(20)$.

51. If $f'(x) = m$, where $m \neq 0$ is a constant, then what is true about $f(x)$?

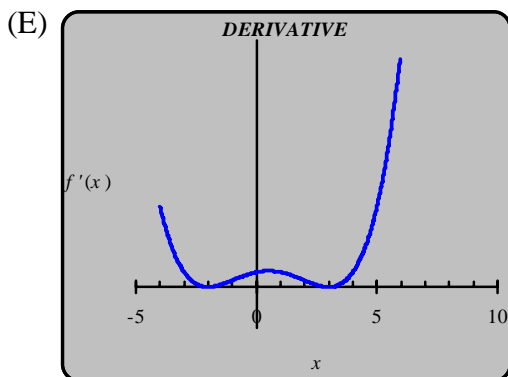
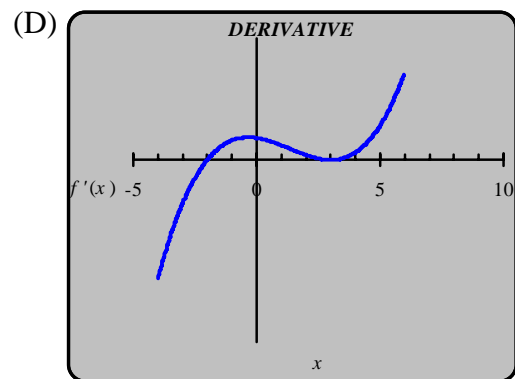
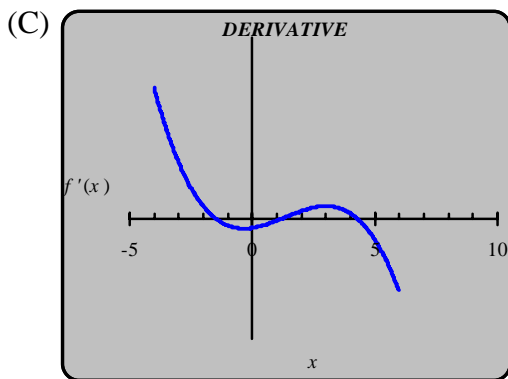
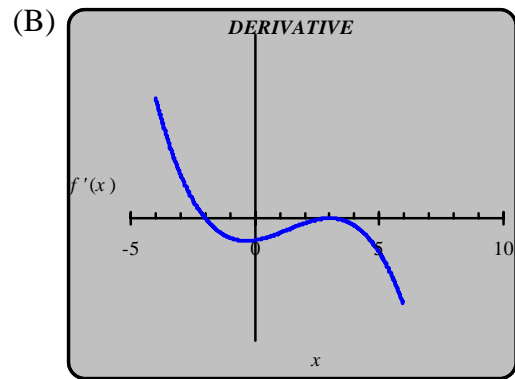
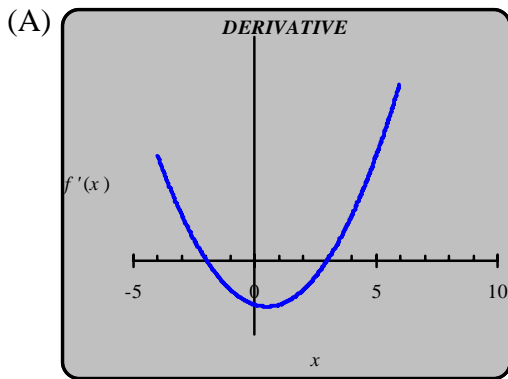
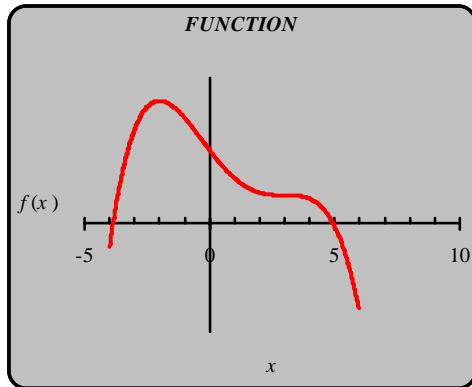
- (A) $f(x) = m$
- (B) $f(x) = 0$
- (C) $f(x) = mx + b$
- (D) $f(x) = 1$
- (E) Impossible to tell.

52. If $f'(x) = -3x + 5$, then which of the following is (are) true about $f(x)$?

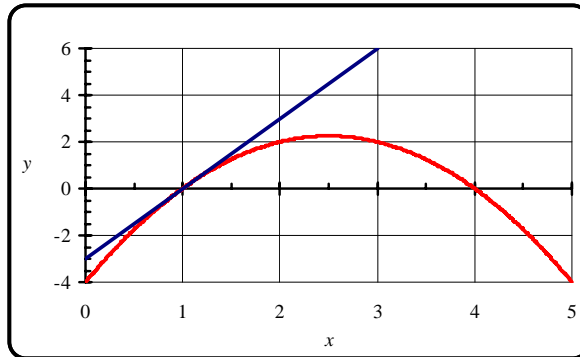
- (i) $f(x)$ is a linear function
- (ii) $f(x)$ is always decreasing
- (iii) $f(x)$ is always concave down

- (A) (i) only
- (B) (ii) only
- (C) (iii) only
- (D) (i) and (ii) only
- (E) (i), (ii) and (iii)

53. The graph of $f(x)$ is given below. Which of the following could be the graph of $f'(x)$?



54. Graphs of $f(x)$ and the line that is tangent to the graph of $f(x)$ at $x = 1$ are given below.



Find $f'(1)$.

- (A) 0
- (B) $1/3$
- (C) 1
- (D) 3
- (E) None of the above

55. Suppose that the revenue (in dollars) from the sale of a particular product can be modeled by $R(t) = 5t^3 - 45t^2 + 130t$ where t is the number of years since 2000.

- (a) Use a difference quotient with an increment of $h = 0.001$ to estimate $R'(6)$.
- (b) Find the equation of the line that is tangent to the graph of $R(t)$ at the point $(6, 240)$.
- (c) Use the equation of the tangent line to estimate the revenue in the year 2010.

56. Suppose that two companies sell the same type of watch. Use the following revenue information to answer the questions. Assume that q refers to the number of watches sold and that revenue is in dollars.

Company 1: $R_1(200) = 40000$ and $MR_1(200) = 55$

Company 2: $R_2(q) = 3R_1(q) - 7000$

- (a) How much revenue will be generated for Company 2 if 200 watches are sold?
- (b) Find $MR_2(200)$.

57. Let $D(q)$ represent the price (in dollars per watch) at which q watches can be sold.

- (a) Give a practical interpretation of $D(200) = 26.95$ in terms of watches.
- (b) Give a practical interpretation of $D'(200) = -0.25$ in terms of watches.

58. Fill in the boxes of the screen capture in such a way that *Solver* would find a value for q which gives a maximum value for $P(q)$, subject to the constraint that $D(q)$ is less than or equal to \$6.

	A	B	C	D	E	F
1	q	$D(q)$	$R(q)$	$C(q)$	$P(q)$	
2	105	\$7	\$761	\$616	\$145	

Solver Parameters

Set Target Cell:

Equal To: Max Min Value of:

By Changing Cells:

Subject to the Constraints:

Cell Reference: Constraint:

Buttons: Add, Change, Delete, Add, Change, Delete, Solve, Close, Options, Reset All, Help

59. Fill in the boxes of the screen capture in such a way that *Solver* would find a value for q which $D(q)$ is equal to \$8.

	A	B	C	D	E	F
1	q	$D(q)$	$R(q)$	$C(q)$	$P(q)$	
2	105	\$7	\$761	\$616	\$145	

Solver Parameters

Set Target Cell:

Equal To: Max Min Value of:

By Changing Cells:

Subject to the Constraints:

Buttons: Add, Change, Delete, Add, Change, Delete, Solve, Close, Options, Reset All, Help

60. Fill in the boxes of the screen capture in such a way that **Solver** would find a value of q that maximizes $P(q)$, subject to the constraint that $R(q)$ is at least \$15,000.

	A	B	C	D	E	F	G	H
1	q	D(q)	R(q)	C(q)	P(q)			
2	500	\$25.00	\$12,500.00	\$5,685.80	\$6,814.20			
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

Solver Parameters [?] [X]

Set Target Cell:

Equal To: Max Min Value of:

By Changing Cells:

Subject to the Constraints:

[Add] [Change] [Delete]

[Solve] [Close] [Options] [Reset All] [Help]

Add Constraint [?] [X]

Cell Reference: Constraint:

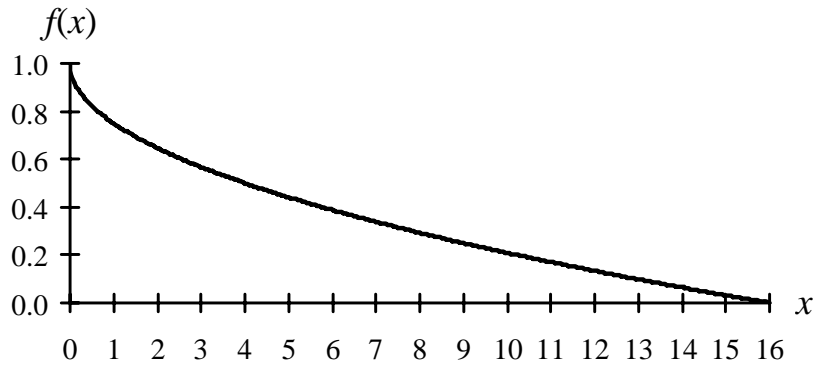
<=

[OK] [Cancel] [Add] [Help]

61. Fill in the boxes in the screen capture below so that **Solver** will find the value of q that will lead to a profit of \$2000 subject to the constraint that the total cost is positive.

	A	B	C	D	E	F	G	H
1	q	D(q)	R(q)	C(q)	P(q)			
2	10	118	1180	5150	-3970			
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								

62. Let $f(x) = 1 - \frac{\sqrt{x}}{4}$. You are to find a midpoint sum which approximates the area under the graph of f , above the x -axis, and over the interval from 1 to 13.



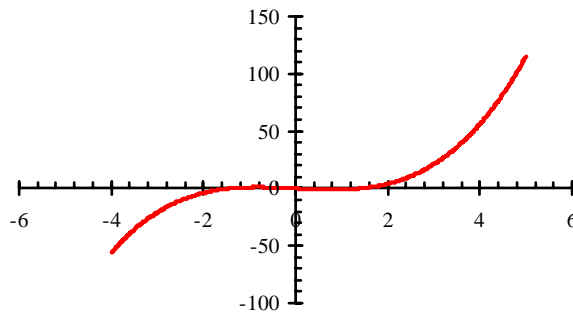
- (a) Find points $x_0, x_1, x_2, x_3,$ and x_4 that subdivide $[1, 13]$ into four subintervals of equal lengths.
- (b) Find the midpoints $m_1, m_2, m_3,$ and m_4 of the subintervals.
- (c) Compute the midpoint sum $S_4(f, [1, 13])$. Round your answer to three decimal places.
63. Let $f(x) = 2x^5 - 3x^2 + 15$.
- (a) Find points $x_0, x_1, x_2, x_3,$ and x_4 that divide the interval from -2 to 0 into four subintervals of equal length.
- (b) Find the midpoints $m_1, m_2, m_3,$ and m_4 of the subintervals.
- (c) Find the value of $f(x)$ at each of the midpoints.
- (d) Compute the midpoint sum $S_4(f, [-2, 0])$.
64. Let $f(x) = 0.75^x + 2$.

- (a) Find points that subdivide the interval $[-12, 4]$ into four subintervals of equal length.
- (b) Find the midpoints of the subintervals.
- (c) Find the value of f at each of the midpoints.
- (d) Compute the midpoint sum $S_4(f, [-12, 4])$.

65. Let $f(x) = 1.5^x - 1$.

- (a) Find points that subdivide the interval $[-2, 4]$ into three subintervals of equal length.
- (b) Find the midpoint of each of the subintervals.
- (c) Find the value of f at each of the midpoints.
- (d) Compute the midpoint sum $S_3(f, [-2, 4])$.

66. Let $f(x) = x^3 - 2x$. You are to approximate the signed area between the graph of f and the x -axis on the interval $[-4, 5]$. The graph is given below:



- (a) Find the points x_0, x_1, x_2 , and x_3 that divide the interval $[-4, 5]$ into three subintervals.
- (b) Find the midpoints, m_1, m_2 , and m_3 , of the three subintervals.
- (c) Find the midpoint sum $S_3(f, [-4, 5])$.

67. Data on the test markets and costs for a good are given below. All monetary amounts are in dollars and all quantities are single units.

Potential National Market: 2,500			
Test Markets			
Market Number	Market Size	Price	Projected Yearly Sales
1	100	\$59.95	50
2	300	\$89.95	45
3	200	\$69.95	80
4	500	\$39.95	350
5	400	\$79.95	120

Cost Data	
Fixed Cost: \$1,000	
Variable Costs	
Quantity	Cost per unit
First 500 units	\$5
Next 500 units	\$3
Further	\$2

- Use the data in Test Market 2 to compute the number of units in the national market that would be sold at a price of \$89.95.
- The equation for the polynomial trend line that has been fitted to the data in the five test markets is given by $f(x) = -0.00009x^2 - 0.0303x + 100.32$. Use this equation to estimate the price per unit if 600 units are produced and sold.
- How much revenue would be earned if 600 units are produced and sold?
- What would be the total cost of producing 600 units?
- How much profit would be earned if 600 units are produced and sold?