

Student: _____

Date: _____

Chapter 1

- Solve for x .
 $6 - 2x = 6x - 10x + 2$
- A publisher for a promising new novel figures fixed costs (overhead, advances, promotion, copy editing, typesetting, and so on) at \$57,000, and variable costs (printing, paper, binding, shipping, etc.) at \$2.70 for each book produced. If the book is sold to distributors for \$19 each, how many must be produced and sold for the publisher to break even?
- (A) Find the slope of the line that passes through the given points.
(B) Find the standard form of the equation of the line.
(C) Find the slope-intercept form of the equation of the line.
(D) Graph the equation of the line.

(5, 5) and (10, 13)

- The manager of a restaurant found that the cost to produce 200 cups of coffee is \$111.10, while the cost to produce 250 cups is \$136.00. Assume the relationship between the cost y to produce x cups of coffee is linear.
(A) Write a linear equation that expresses the cost, y , in terms of the number of cups of coffee, x
(B) How many cups of coffee should be produced, if the cost of production is between \$191.00 - \$266.00?
- A farmer buys a new tractor for \$156,000 and assumes that it will have a trade-in value of \$79,000 after 10 years. The farmer uses a constant rate of depreciation to determine the annual value of the tractor.
(A) Find a linear model for the depreciated value V of the tractor t years after it was purchased.
(B) What is the depreciated value of the tractor after 6 years?
(C) When will the depreciated value fall below \$50,000?
(D) Graph V for $0 \leq t \leq 20$.
- A linear regression model for the revenue data for a company is $R = 26.9t + 209$ where R is the total annual revenue and t is time since 1/31/02 in years.

Billions of Dollars	12 months ending 1/31/02	12 months ending 1/31/03	12 months ending 1/31/04	12 months ending 1/31/05	12 months ending 1/31/06
Revenue	205	239	254	284	317
Gross Profit	49	53	57	62	74

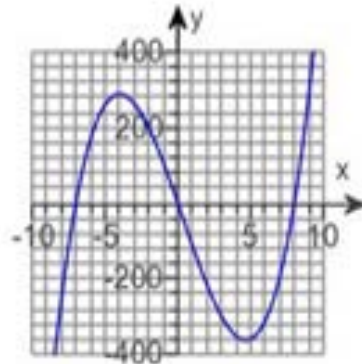
- Draw a scatter plot of the data and the graph of the model on the same axes.
- Predict the company's annual revenue for the period ending 1/31/10.

Chapter 2

7.

Use the graph of a function f to determine x or y to the nearest integer, as indicated. Note there may have more than one answer.

$$0 = f(x)$$



8. Find the domain of the following function.

$$f(x) = \frac{x - 8}{x + 6}$$

9.

Use the price-demand function below, to answer parts (A), (B), and (C).

$$p(x) = 90 - 3x \quad 1 \leq x \leq 20$$

(A) What is the revenue function?

$$R(x) = \boxed{}$$

What is the domain of the revenue function?

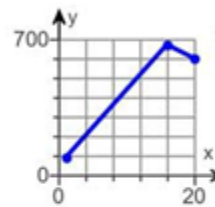
- A. [1,20]
- B. [0,672]
- C. [0,20]
- D. [0,90]

(B) Complete the table.

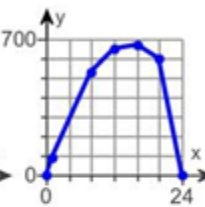
Revenue	
x (Millions)	$R(x)$ (Millions \$)
1	87
4	<input type="text"/>
8	<input type="text"/>
12	<input type="text"/>
16	<input type="text"/>
20	<input type="text"/>

(C) Choose the best graph of the revenue function using the points from the table.

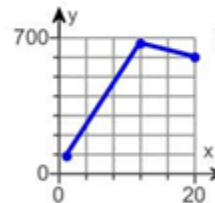
A.



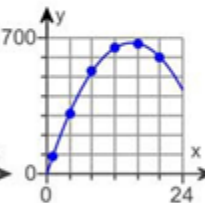
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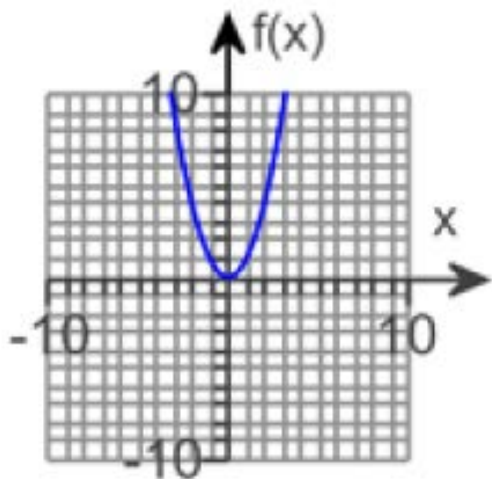
C.



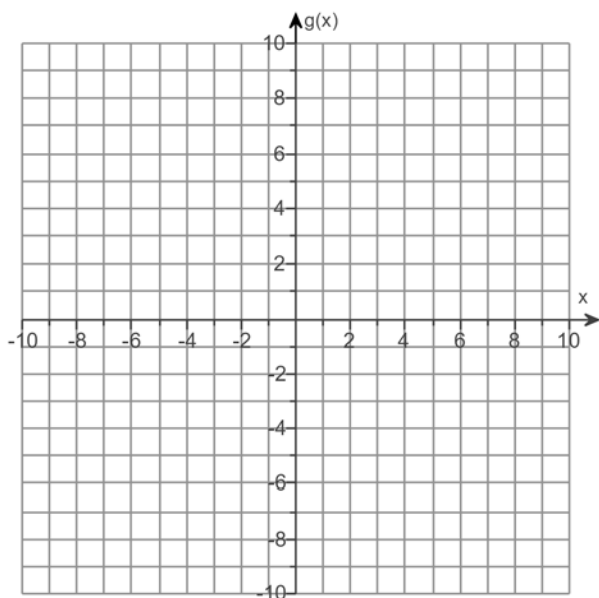
D.



10. The graph of $g(x) = (x + 3)^2 + 5$ is related to the graph of $f(x) = x^2$, shown below.

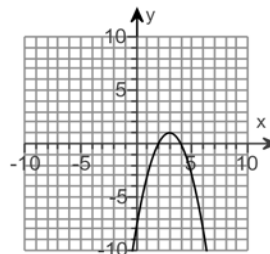


How is the graph of $g(x) = (x + 3)^2 + 5$ related to the graph of $f(x) = x^2$?
Sketch a graph of the function.



11. Use the given graph of the function to find the function information.

- (A) Intercepts
- (B) Vertex
- (C) Maximum or minimum
- (D) Range



(A) State the x-intercept(s).
State the y-intercept(s).

(B) The vertex is: _____ (State answer in point form)

(C) What is the maximum/minimum value of the function?

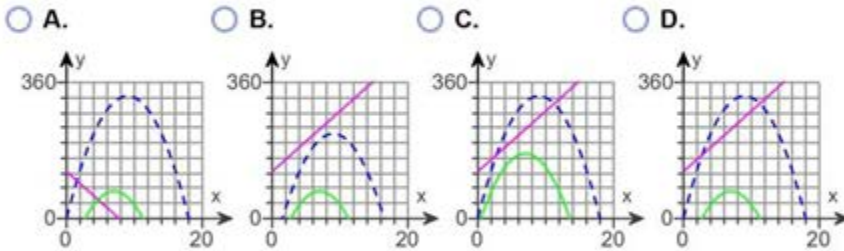
(D) The range is: _____. (State answer in inequality and interval notation.)

12. A company manufactures microchips. Use the revenue function $R(x) = x(72 - 4x)$ and the cost function $C(x) = 124 + 16x$ to answer parts (A) through (D), where x is in millions of chips and $R(x)$ and $C(x)$ are in millions of dollars. Both functions have domain $1 \leq x \leq 20$.

(A) Form a profit function P , and graph R , C , and P in the same rectangular coordinate system.

$$P(x) = \underline{\hspace{4cm}}$$

Which graph below shows $R(x)$, $C(x)$, and $P(x)$? The blue, dashed curve represents R ; the pink line represents C ; and the green, solid curve represents P .



(B) Discuss the relationship between the intersection points of the graphs of R and C and the x intercepts of P .

The x -values of the intersection points of R and C are (1) _____ to the x -intercepts of P .

(C) Find the x intercepts of P to the nearest thousand chips. Find the break-even points to the nearest thousand chips.

The x -intercepts of P occur at $x = \underline{\hspace{2cm}}$ million chips.

(Use a comma to separate answers as needed. Round to three decimal places as needed.)

Do the x -intercepts of the profit function indicate the break-even points?

- Yes
 No

(D) Find the value of x (to the nearest thousand chips) that produces the maximum profit. Find the maximum profit (to the nearest thousand dollars), and compare it to the maximum revenue.

The maximum profit occurs at $x = \underline{\hspace{2cm}}$ million chips.

(Round to three decimal places as needed.)

The maximum profit is $\underline{\hspace{2cm}}$ million dollars.

(Round to three decimal places as needed.)

The maximum revenue is $\underline{\hspace{2cm}}$ million dollars.

(Round to three decimal places as needed.)

The maximum profit is (2) _____ to the maximum revenue.

Word list for (1) and (2) fill in the blank above:

- | | |
|--|--|
| <p>(1) <input type="radio"/> smaller compared
 <input type="radio"/> greater compared
 <input type="radio"/> equal</p> | <p>(2) <input type="radio"/> equal
 <input type="radio"/> greater compared
 <input type="radio"/> smaller compared</p> |
|--|--|

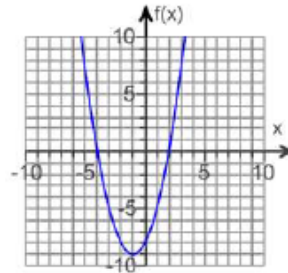
13. Find the equation for any horizontal asymptotes for the function below.

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

14. Find the equation of any vertical asymptote for the function below.

$$f(x) = \frac{x^2 + 2x + 2}{x - 10}$$

15. Write an equation for the lowest-degree polynomial function with the graph and intercepts shown in the figure. For this exercise, make the leading coefficient be 1 or -1.



What is an equation for the polynomial function?

$f(x) =$

16. A consulting firm, using statistical methods, provided a veterinary clinic with the cost equation

$$C(x) = 0.00048(x - 300)^3 + 228,000$$
$$100 \leq x \leq 1,000$$

where $C(x)$ is the cost in dollars for handling x cases per month. The average cost per case is given by $C(x) = \frac{C(x)}{x}$.

Write the equation for the average cost function C . $C(x) =$ _____

17. Solve the equation.

$$10^x = 25$$

18. Solve the equation to four decimal places.

$$e^x = 2.762$$

19. Graph the equations below by point-by-point plotting or shifts/translations from the base graphs.

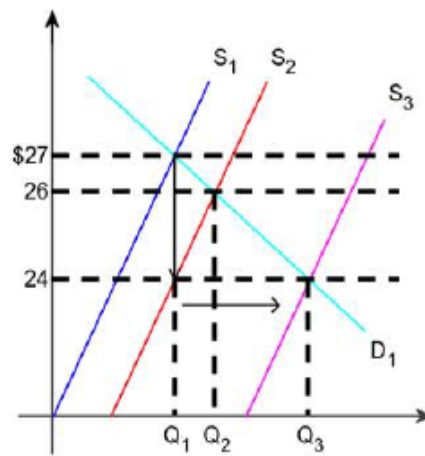
Indicate increasing and decreasing intervals.

(A) $y = \ln(x + 7)$ (B) $y = \log x + 7$

20. Greg sketches the Supply functions of the first three quarters of the calendar year, and notices that all 3 lines are parallel to one another, as seen in the graph to the right.

Based on the graphs, Greg can assume that the supply functions that generated those lines all have the same

(1) _____



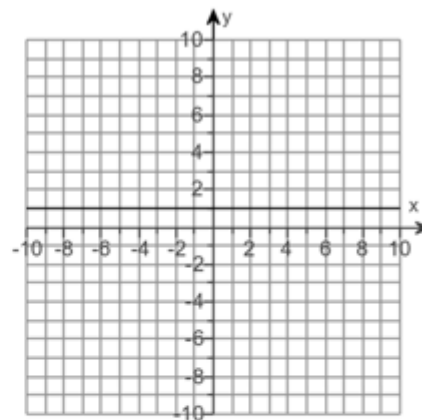
- (1) x-intercept.
 slope.
 constant.
 y-intercept.

21. Look carefully at the graph to the right. What do all of the points on the line have in common? What do you know about the slope of the line?

All of the points on the line have the same

(1) _____

The slope of the line is (2) _____



- (1) x-coordinate
 y-coordinate
(2) zero
 undefined

Chapter 3

22. Determine the present value P you must invest to have the future value A at simple interest rate r , after time t .

$$A = \$9000.00, r = 11.0\%, t = 39 \text{ weeks}$$

(Round to the nearest cent.)

23. Use the formula for the amount, $A = P(1 + rt)$, to find the indicated quantity.

$$A = \$1,258; P = \$740; r = 14\%; t = ?$$

24. A loan of \$910 was repaid at the end of 12 months with a check for \$935. What annual rate of interest was charged?
(Round to two decimal places as needed.)

25. An investment company pays 8% compounded semiannually. You want to have \$19,000 in the future.

(A) How much should you deposit now to have that amount 5 years from now? (Round to the nearest cent.)

(B) How much should you deposit now to have that amount 10 years from now? (Round to the nearest cent.)

26. In order to accumulate enough money for a down payment on a house, a couple deposits \$606 per month into an account paying 3% compounded monthly. If payments are made at the end of each period, how much money will be in the account in 5 years? (Round to the nearest dollar.)

27. Acme Annuities recently offered an annuity that pays 5.7% compounded monthly. What equal monthly deposit should be made into this annuity in order to have \$130,000 in 9 years? (Round to the nearest cent.)

28. If you buy a computer directly from the manufacturer for \$2,549 and agree to repay it in 60 equal installments at 1.73% interest per month on the unpaid balance, how much are your monthly payments? How much total interest will be paid? (Round to two decimal places.)

Chapter 4

29. Solve the system by substitution method.

$$\begin{aligned}x - 3y &= -2 \\ y &= -2x + 24\end{aligned}$$

30. Solve by elimination by addition method.

$$\begin{aligned}-6x + 4y &= -2 \\ 36x - 24y &= 13\end{aligned}$$

31. Perform the row operation $-3R_2 \rightarrow R_2$ on the following matrix.

$$\left[\begin{array}{cc|c} 1 & -3 & 2 \\ 4 & -6 & -8 \end{array} \right]$$

32. Solve using augmented matrix methods.

$$\begin{aligned}5x_1 - 2x_2 &= 1 \\ 15x_1 - 6x_2 &= -3\end{aligned}$$

33. Solve using augmented matrix methods.

$$\begin{aligned}3x_1 + 12x_2 &= 6 \\ -2x_1 - 8x_2 &= -4\end{aligned}$$

34. Solve using augmented matrix methods.

$$\begin{aligned}4x_1 - x_2 &= -9 \\ 3x_1 + 3x_2 &= -3\end{aligned}$$

35. Use row operations to change the matrix to reduced form.

$$\left[\begin{array}{cc|c} 1 & 4 & -2 \\ 0 & 1 & 2 \end{array} \right]$$

36. Find $B - A$.

$$A = \begin{bmatrix} 5 & 4 \\ 7 & 8 \end{bmatrix} \quad B = \begin{bmatrix} -9 & 9 \\ 2 & -8 \end{bmatrix}$$

37. Perform the addition, if possible.

$$\begin{bmatrix} 4 & -6 \\ 1 & 0 \end{bmatrix} + \begin{bmatrix} -3 & 9 \\ 2 & -5 \end{bmatrix}$$

Is the addition possible?

- Yes
 No

38. Perform the indicated operation, if possible.

$$7 \begin{bmatrix} 7 & -7 & -9 & -7 \\ -9 & 9 & 11 & -7 \end{bmatrix}$$

39. Find the product of the following matrices, if possible.

$$\begin{bmatrix} -8 & 9 \\ 0 & -6 \end{bmatrix} \begin{bmatrix} 3 \\ 6 \end{bmatrix}$$

40. Perform the indicated operation, if possible.

$$\begin{bmatrix} 9 & 8 \\ 8 & 0 \end{bmatrix} \begin{bmatrix} -5 & 6 \\ 9 & -7 \end{bmatrix}$$

41. Find the matrix product. Note that each product can be found mentally, without the use of a calculator or pencil-and-paper calculations.

$$\begin{bmatrix} 3 & 5 \\ 7 & 9 \end{bmatrix} \begin{bmatrix} 9 & 0 \\ 0 & 9 \end{bmatrix}$$

42. Find the product.

$$\begin{bmatrix} 5 & -5 & 5 \end{bmatrix} \begin{bmatrix} -5 \\ 1 \\ 2 \end{bmatrix}$$

43. Find AB , if possible.

$$A = \begin{bmatrix} 9 & -3 & 8 \\ 0 & 7 & -9 \end{bmatrix} \quad B = \begin{bmatrix} -7 & 2 \\ 9 & 8 \end{bmatrix}$$

44. Find the inverse of the given matrix, if it exists.

$$M = \begin{bmatrix} -2 & -3 \\ 3 & 4 \end{bmatrix}$$

45. Solve the system as matrix equations using inverses.

$$\begin{aligned} -5x_1 + 3x_2 &= 8 \\ 3x_1 - 6x_2 &= -30 \end{aligned}$$

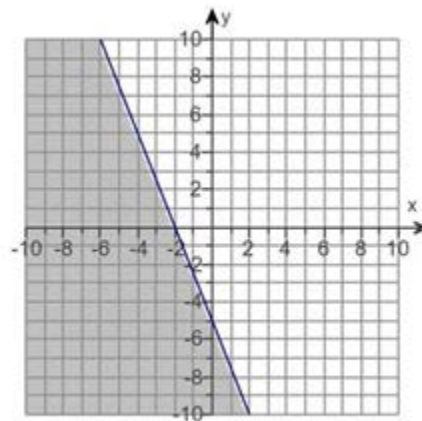
- A. (6,2)
 B. (2,6)
 C. (-6,-2)
 D. (-2,-6)

Chapter 5

46. State the linear inequality whose graph is given in the figure. Write the boundary line equation in the form $Ax + By = C$, with A , B , and C integers, before stating the inequality.

Choose the correct inequality below.

- A. $5x + 2y < -10$
 B. $5x + 2y \geq -10$
 C. $5x + 2y > -10$
 D. $5x + 2y \leq -10$



47. Define two variables and translate the sentence into an inequality.

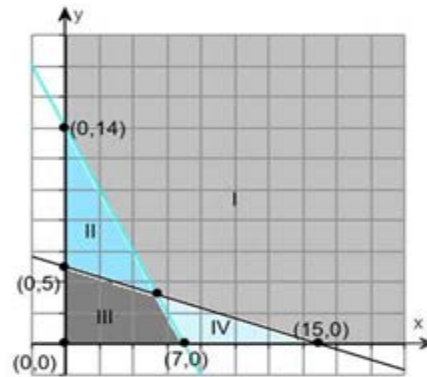
Enrollment in finite mathematics plus enrollment in calculus is less than 900.

Let x be the number of students enrolled in finite mathematics and y be the number of students enrolled in calculus. Use x and y to write the inequality.

48. Match the solution region of the following system of linear inequalities with one of the four regions shown in the figure. Identify the unknown corner point of the solution region.

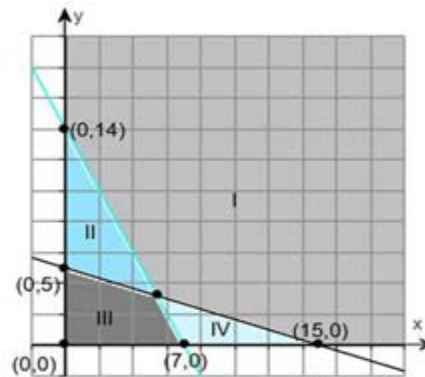
$$\begin{aligned} x + 3y &\leq 15 \\ 2x + y &\leq 14 \\ x &\geq 0 \\ y &\geq 0 \end{aligned}$$

- region III
- region I
- region II
- region IV



The coordinates of all of the corner points are given on the graph except one corner point. What are the coordinates of the remaining corner point?

$(x,y) = (\quad , \quad)$
(Type an integer or a fraction.)



49. A manufacturing company makes two types of water skis, a trick ski and a slalom ski. The relevant manufacturing data are given in the table.

Department	Labor-Hours per Ski		Maximum Labor-Hours Available per Day
	Trick Ski	Slalom Ski	
Fabricating	12	8	384
Finishing	1	1	36

Answer parts (A), (B), and (C) below.

- (A) If the profit on a trick ski is \$40 and the profit on a slalom ski is \$30, how many of each type of ski should be manufactured each day to realize a maximum profit? What is the maximum profit?
- (B) Discuss the effect on the production schedule and the maximum profit if the profit on a slalom ski decreases to \$15.
- (C) Discuss the effect on the production schedule and the maximum profit if the profit on a slalom ski increases to \$45.
50. The officers of a high school senior class are planning to rent buses and vans for a class trip. Each bus can transport 56 students, requires 5 chaperones, and costs \$1,100 to rent. Each van can transport 7 students, requires 1 chaperone, and costs \$120 to rent. Since there are 392 students in the senior class that may be eligible to go on the trip, the officers must plan to accommodate at least 392 students. Since only 50 parents have volunteered to serve as chaperones, the officers must plan to use at most 50 chaperones. How many vehicles of each type should the officers rent in order to minimize the transportation costs? What are the minimal transportation costs?

