

**REVIEW FOR FINAL EXAMINATION**

In problems 1-6, perform the indicated operations and simplify.

1.  $3x^3 - 5x + 2 + 2x^2 - 3x - 7$

2.  $5x^2 + 2x - 4 - x^2 - x + 9$

3.  $2x + 3 \quad 3x - 7$

4.  $2x \quad 5x - 8 \quad 4 - x$

5.  $3x - 4 \quad x^2 - 7x + 2$

6.  $2x - 3^2$

In problems 7-15, factor completely, if possible. Otherwise, write "not factorable".

7.  $12a^3bc - 18a^2bc^2 + 6a^2c$

8.  $x^2 + 20x + 36$

9.  $12x^4 - 8x^3 - 4x^2$

10.  $x^2 + 36x$

11.  $x^2 + 36$

12.  $4x^2 - 25$

13.  $9x^2 + 6x + 1$

14.  $6x^2 + 11x - 10$

15.  $x^2 + 3x - 6$

16. Simplify:  $\frac{x^2 + x - 12}{x^2 + 7x + 12}$

17. Simplify:  $\frac{2x^3 - 6x^2}{x^3 - 2x^2 - 3x}$

In 18-21, perform the indicated operations. Final answers must be simplified.

18.  $\frac{1}{x^2y} - \frac{2}{xy} - \frac{3}{xy^2}$

19.  $\frac{4z - 9}{3z} - \frac{3z - 8}{4z}$

20.  $\frac{3x - 6}{x^2 - x - 6} \cdot \frac{x^2 + 5x + 6}{2x + 6}$

21.  $\frac{x^2 + 4x + 3}{x^2 - 9} \div \frac{x^2 - 1}{x - 1}$

Solve each equation algebraically in problems 22-33.

22.  $7 - 3x = 11x + 5$

23.  $9 - 2 \quad 3 - x = 15 + 4x$

24.  $\frac{2}{3}x + \frac{1}{2} = \frac{3}{4} - 2x$

25.  $0.65m = 0.43 - 1.5m$

26.  $2x^2 - 18x = 0$

27.  $x^2 = 6x + 7$

28.  $x + 2 \quad x - 1 = 4$

29.  $6y^2 + 5y - 6 = 0$

30.  $x + \frac{4}{x} = -5$

31.  $\frac{1}{3a} - \frac{2}{a} = 10$

32. Round solutions to 4 decimal places:  
 $x^2 + 6x + 2 = 0$

33. Round solutions to 4 decimal places:  
 $2x + 4 = 3x^2$

In problems 34 and 35, solve each inequality and graph the solution.

34.  $3x + 8 < 20$

35.  $9 - 5x - 2 \geq 4$

In problems 36-49, simplify the expression where possible. Express answers without using negative exponents.

36.  $x^5 x^4$

37.  $x^5 \cdot 4$

38.  $x^5 + x^4$

39.  $-2x^3$

40.  $-2x^{-3}$

41.  $\frac{x^2 y^4}{x^7 y}$

42.  $\frac{x^{-2}}{x^{-5}}$

43.  $3x^0$

44.  $3x^0$

45.  $x^{-2} \cdot 4$

46.  $-2x^2 y^{-1} \cdot 3$

47.  $\frac{3x^3 y^{-1} z^{-2}}{x^{-5} y^2 z}$

48.  $\frac{4x^{-5} \cdot 3}{x^{-3} \cdot 2}$

49.  $-2xy^2 \cdot 3 - 3xy^2$

50. Convert to scientific notation.

a.  $0.00000074$

b.  $346.5$

51. Convert to standard notation.

a.  $2.3 \times 10^{-4}$

b.  $1.437 \times 10^6$

52. Evaluate  $3^{-4}$ 53. Evaluate  $x^0 + x^{-1}$  for  $x = 4$ 54. Solve for  $x$ :  $A = S + Skx$ 55. Solve for  $y$ :  $ax + by = c$ 56. Solve for  $M$ :  $R = \frac{nE}{M - n}$ 57. Evaluate  $2y^3 - 3y^2 - y$  for  $y = -3$

58. Given  $A = \frac{h B + b}{2}$

a. Find the value of  $A$  if  $h = 50$ ,  $B = 3$ ,  $b = 7$

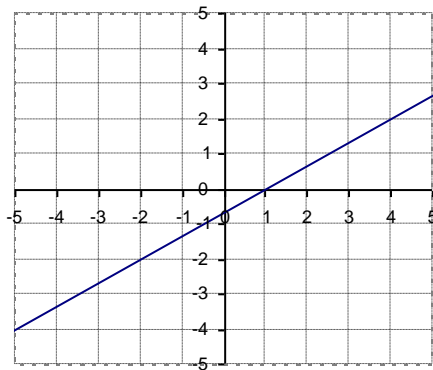
b. Find the value of  $B$  if  $A = 36$ ,  $h = 6$  and  $b = 5$

59. Which of the following points, if any, are on the line  $2x + 3y = 12$  ?

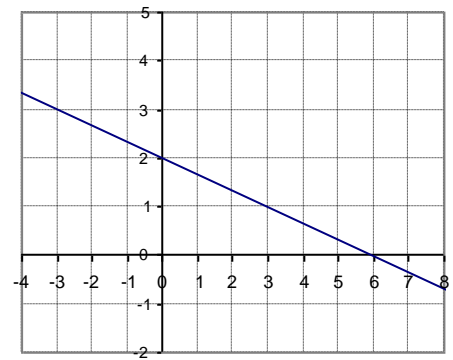
- $-2, 8$        $0, -4$        $3, 2$        $6, 0$        $-6, 12$

60. Using the graphs below, find the slope of each line.

a.



b.



61. Find the slope and y-intercept of each line.

a.  $y = -x + \frac{1}{2}$

b.  $3x - 2y + 18 = 0$

c.  $x = 2y - 5$

62. Find the slope, if it exists, for each of the lines whose equation is given below:

a.  $x = -7$

b.  $y = 4$

63. Find the slope of the line through  $(1, 3)$  and  $(-4, 8)$

64. Find the  $x$  and  $y$ -intercepts and use these to sketch the graph of  $4x - 3y = 12$ .

In 65 - 67, sketch the graph of each equation:

65.  $y = 3x$

66.  $y = -4$

67.  $x = 3$

68. Sketch the graph of the line with slope 2 containing the point  $(-3, 1)$ .

In 69 and 70, find the equation of the line with the given characteristics.

69. Find the equation of the line containing the point  $(-3, 5)$  and having slope  $-\frac{2}{3}$ .

70. Find the equation of the line containing the points  $(4, -1)$  and  $(2, 7)$ .

In 71-72, determine whether the graphs of the equations are parallel or not parallel.

71. 
$$\begin{cases} y = 5x - 7 \\ 10x - 2y = 15 \end{cases}$$

72. 
$$\begin{cases} x - y = 2 \\ x - 3y = 2 \end{cases}$$

73. Solve by graphing: 
$$\begin{aligned} y &= 2x + 7 \\ y &= -x + 1 \end{aligned}$$

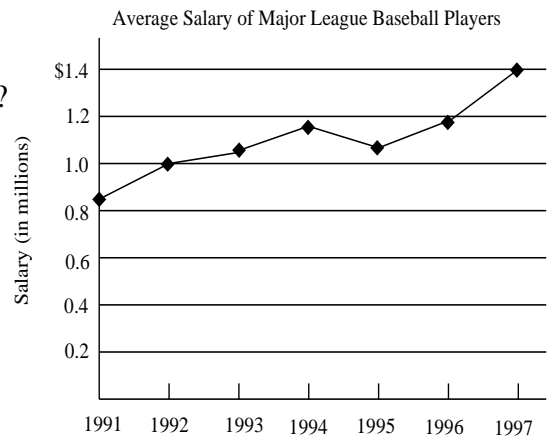
In 74-75, solve algebraically.

74. 
$$\begin{aligned} 2x + 5y &= 1 \\ 3x - 4y &= 36 \end{aligned}$$

75. 
$$\begin{aligned} 3x - y &= 11 \\ 5x + 4y &= 7 \end{aligned}$$

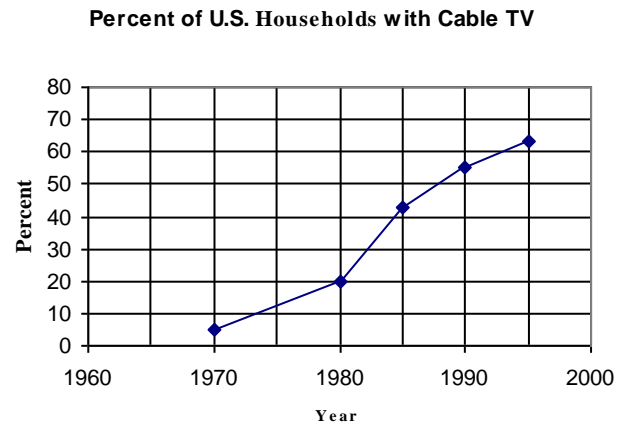
76. Use the graph to answer the following questions.

- a. In what year was the average salary \$1,000,000?
- b. How much did the salaries increase between 1992 and 1997?
- c. What was the average salary in 1995?



77. Use the graph to answer the following questions:

- a. What percent of households had cable TV in 1990?
- b. In what year did 20% of households have TV?
- c. Between what two of the years labeled was the greatest increase in the percent of households with cable TV?



78. The base of a triangle is 5 cm greater than the height. The area is  $42 \text{ cm}^2$ . Find the height and the base.
79. The perimeter of a certain rectangle is 98 cm. The length is 7 cm less than 3 times the width. What are the dimensions of the rectangle?
80. Find the length of the shorter leg of a right triangle if the longer leg is 12 feet more than the shorter leg and the hypotenuse is 12 feet less than twice the shorter leg.
81. The length of a rectangular garden is 6 meters greater than the width. The area of the rectangle is  $135 \text{ m}^2$ . Find the length and width.
82. Find all numbers that satisfy the statement, "If 6 times the number is added to the square of the number, the result is 40".
83. The window ledge is 17 feet above the ground. Your ladder is 20 feet long. How far away from the building must you place the foot of the ladder so it will just rest on the window ledge? Give distance to the nearest tenth of a foot.
84. Karl is in charge of purchasing nuts for his company's party. The company has allocated \$40 for 10 pounds of nuts. Peanuts cost \$2 per pound and mixed nuts cost \$7 per pound. How many pounds of each type should be purchased?
85. Suppose 850 tickets are sold for a game for a total of \$1100. If adult tickets cost \$1.50 and children's tickets cost \$1.00, how many of each kind of tickets were sold?
86. Mr. Jones has \$20,000 to invest. He invests part at 6% and the rest at 7%. If he earns \$1280 interest after one year, how much did he invest at each rate?
87. A grocer plans to mix candy that sells for \$1.20 a pound with candy that sells for \$2.40 a pound to get a mixture that he plans to sell for \$1.65 a pound. How much of the \$1.20 and \$2.40 candy should he use if he wants 80 pounds of the mix?

**ANSWERS:**

- |                                |                           |                            |                           |
|--------------------------------|---------------------------|----------------------------|---------------------------|
| 1. $3x^3 + 2x^2 - 8x - 5$      | 2. $4x^2 + 3x - 13$       | 3. $6x^2 - 5x - 21$        | 4. $-10x^3 + 56x^2 - 64x$ |
| 5. $3x^3 - 25x^2 + 34x - 8$    | 6. $4x^2 - 12x + 9$       | 7. $6a^2c - 2ab - 3bc + 1$ | 8. $x + 2 \quad x + 18$   |
| 9. $4x^2 - 3x + 1 \quad x - 1$ | 10. $x \quad x + 36$      | 11. not factorable         | 12. $2x - 5 \quad 2x + 5$ |
| 13. $3x + 1^2$                 | 14. $3x - 2 \quad 2x + 5$ | 15. not factorable         | 16. $\frac{x - 3}{x + 3}$ |

17.  $\frac{2x}{x+1}$

18.  $\frac{y-2xy-3x}{x^2y^2}$

19.  $\frac{7z-12}{12z}$

20.  $\frac{3(x-2)}{2(x-3)}$

21.  $\frac{1}{x-3}$

22.  $x = \frac{1}{7}$

23.  $x = -6$

24.  $x = \frac{3}{32}$

25.  $m = \frac{1}{5}$  or 0.2

26.  $x = 0, 9$

27.  $x = 7, -1$

28.  $x = -3, 2$

29.  $x = -\frac{3}{2}, \frac{2}{3}$

30.  $x = -4, -1$

31.  $a = -\frac{1}{6}$

32.  $x = -0.3542, -5.6458$

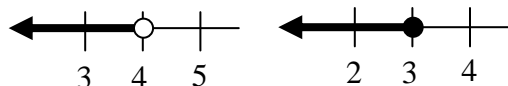
33.  $x = 1.5352, -0.8685$

34.  $x < 4$

35.  $x \leq 3$

36.  $x^9$

37.  $x^{20}$



38. can't be simplified

39.  $-8x^3$

40.  $-\frac{2}{x^3}$

41.  $\frac{y^3}{x^5}$

42.  $x^3$

43. 3

44. 1

45.  $x^8$

46.  $\frac{-8x^6}{y^3}$

47.  $\frac{3x^8}{y^3z^3}$

48.  $\frac{x^{21}}{64}$

49.  $24x^4y^8$

50. a)  $7.4 \times 10^{-7}$

51. a) 0.00023

52.  $\frac{1}{81}$

53.  $\frac{5}{4}$

b)  $3.465 \times 10^2$

b) 1,437,000

54.  $x = \frac{A-S}{Sk}$

55.  $y = \frac{c-ax}{b}$

56.  $M = \frac{nR+nE}{R}$

57. -78

58. a) 250

59. 3, 2 and 6, 0

60 a)  $\frac{2}{3}$

61. a)  $m = -1, b = \frac{1}{2}$

b) 7

b)  $-\frac{1}{3}$

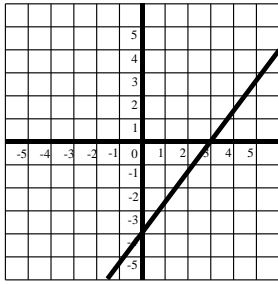
b)  $m = \frac{3}{2}, b = 9$

62. a) undefined  
b) 0

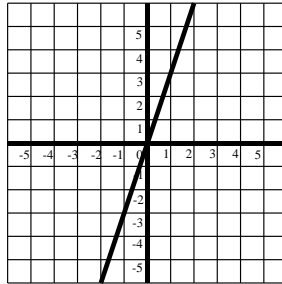
63.  $m = -1$

c)  $m = \frac{1}{2}, b = \frac{5}{2}$

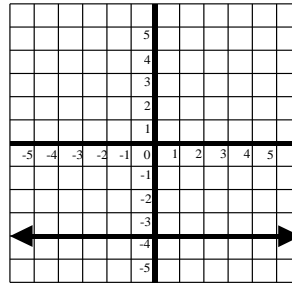
64. 3, 0, 0, -4



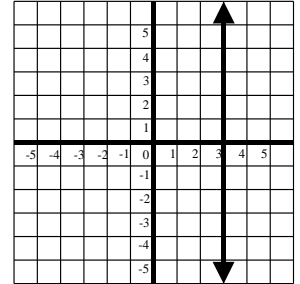
65.



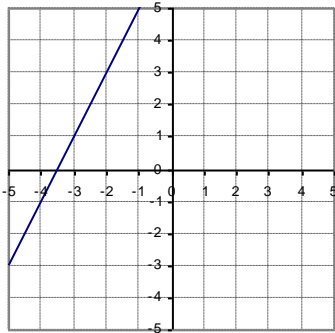
66.



67.



68.



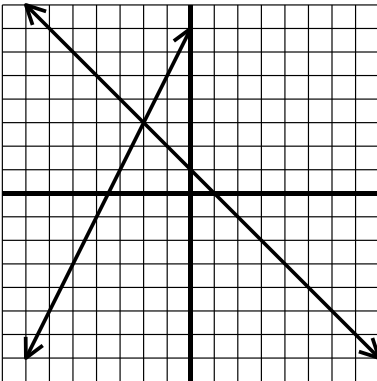
69.  $y = -\frac{2}{3}x + 3$

70.  $y = -4x + 15$

71. parallel lines

72. not parallel

73.  $x = -2$ ,  $y = 3$



74.  $x = 8$ ,  $y = -3$

75.  $x = 3$ ,  $y = -2$

- 76.a. 1992
- b. \$400,000
- c. about \$1,100,000

- 77 a. about 55%
- b. 1980
- c. 1980 and 1990

78. base = 12 cm, height = 7 cm

79. width = 14 cm, length = 35 cm

80. 36 ft

81. length = 15 m, width = 9 m

82. 4 and -10

83. 10.5 ft

84. 4 pounds of mixed nuts, 6 pounds of peanuts

85. 500 adults, 350 children

86. \$12,000 @ 6%, \$8,000 @ 7%

87. 50 lbs of the \$1.20/lb candy  
30 lbs of the \$2.40/lb candy