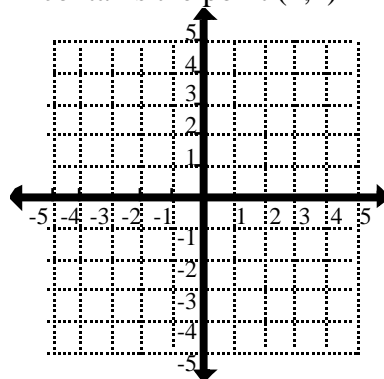
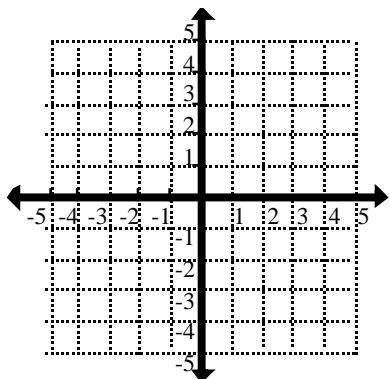


MATD 0390 - Intermediate Algebra

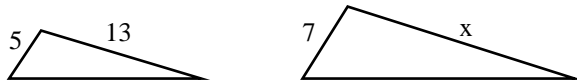
Review for Pretest

1. Evaluate: a) $3 - 5 \cdot 2$ b) -3^2 c) $5(-2)^2$ d) $\frac{5}{0}$
2. Evaluate: $2[3 - 4(2 - 5)]$ | 3. Evaluate: $3 - 5 - (-7) + (-8)$
4. Evaluate: $-5^2 - 2 \cdot 3^2 + 2[6 - 3(4 - 9)]$ | 5. Simplify: $2[3x - 4(2x - 5)]$
6. Solve: $-2(3x + 6) + 12 = -6(4x + 1) + 10x$
7. Solve: $\frac{x}{7} = 3$ | 8. Solve for b: $A = \frac{1}{2}(b + c)$
9. Determine the slope of the line that contains the points $(-2, 5)$ and $(-5, -7)$.
10. What is the slope of the line $-3x + 5y = 15$?
11. What is (a) the x-intercept and (b) the y-intercept of the line $-3x + 5y = 15$?
12. Graph $4x - 3y = 12$.
13. Draw the line with slope -3 which contains the point $(2, 1)$.



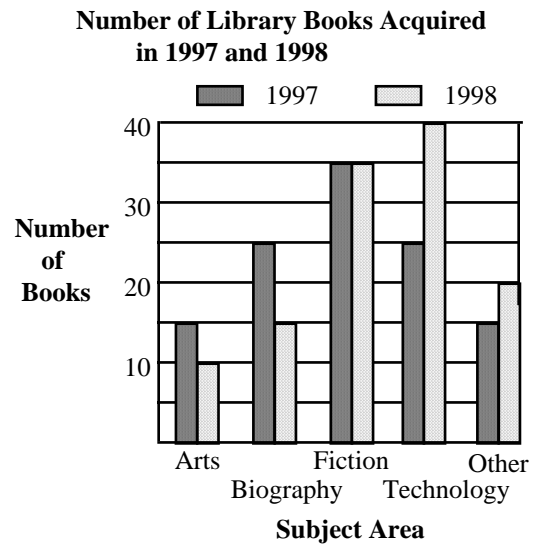
14. What is the equation of the line with slope $-\frac{2}{3}$ and y-intercept 4?
15. Write the equation of a line with slope $m = -3$ and containing the point $(2, -1)$.
16. Solve the system: $\begin{cases} 2x - y = 6 \\ -3x + 2y = -4 \end{cases}$ | 17. Solve the system: $\begin{cases} 3x - 2y = 12 \\ 5x + 3y = 1 \end{cases}$
18. Twice the sum of a number and 7 is 3 more than the number. Write an equation to represent this relationship. Let n represent the number.
19. Mae bought a jacket on sale at 15% off the regular price and paid \$71.40 for it. What was the regular price of the jacket?
20. Will's salary this year is 7% greater than it was last year. If his salary this year is \$37,450, what was his salary last year?

21. A truck rental company charges a base rate of \$19.95 plus an additional \$0.35 for each mile the truck is driven. If the total charge for a truck rental was \$107.45, how many miles was it driven? If m = total miles driven, write an equation which you could solve to answer the question. (Do not actually solve it.)
22. The second angle of a triangle is twice as big as the first angle. The third angle is 18° more than the first angle. What are the angles?
23. James works two part time jobs. One pays \$7/hr and the other pays \$10/hr. Last week he worked a total of 32 hours and made a total of \$278. How many hours did he work at each job?
24. Two cars are 360 miles apart and traveling towards one another. Car B is going 10 mph slower than car A. If they pass each other after 3 hours, how fast is each traveling?
25. Jay's coffee house sells two types of coffee beans. Ordinary beans cost \$6.30/lb and special beans cost \$8.10/lb. They want to mix the two types to create 30 lbs. of a house blend which they will sell at \$6.90/lb. How much of each type should they use?
26. Harry invested a total of \$20,000, part at 7% and part at 10%. How much did he invest at each rate if the total interest earned in one year was \$1640?
27. If you can travel 25 miles in 35 minutes, how long should it take to travel 125 miles? (Assume speed is the same.) At what speed (in miles per hour) are you traveling? (Note: To convert from minutes to hours, divide by 60 minutes.)



28. If these two triangles are similar, what is the length of side x ?

29. The bar graph above shows the number of new books in several categories that were acquired by a school library in 1997 and 1998.



- In what category did the number of books increase the most from 1997 to 1998?
- In what category did the number of books decrease the most from 1997 to 1998?
- In what category did the number of books remain constant from 1997 to 1998?
- How many art books were acquired in 1997?
- What was the total number of technology books acquired in 1997 and 1998 combined?
- What was the percentage increase in the number of technology books from 1997 to 1998?

30. Simplify: $(2x^4 y^2)^3(3xy^2)$

31. Simplify and write your answer without negative exponents: $(-3x^{-5} y)(4x^3 y^2)$

32. Simplify and write your answer without negative exponents: $(-5rs^{-3} t^0)^2$

33. Simplify and write your answer without negative exponents: $\frac{15m^5n^7}{3mn^{-4}}$

34. Write in scientific notation: a) 230,000,000,000 b) 0.000076

35. Write in standard notation: a) 3.2×10^{-5} b) 2.7×10^{11}

36. Multiply and give the result in scientific notation: $(3 \times 10^{-3})(4 \times 10^5)$

37. Divide and give the result in scientific notation: $(2.4 \times 10) \div (3.0 \times 10^4)$

38. Add: $(3x^2 - 2x + 3) + (-x^2 + 4x - 6)$

39. Subtract: $(3w^2 + w - 2) - (4w^2 - 2w - 7)$

40. Multiply: $(2u - 3)(5u + 1)$

41. Multiply: $(3p - 2)(2p^2 - p + 4)$

42. Multiply: $(2u - 3)(2u + 3)$

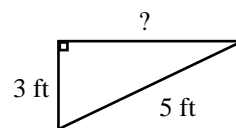
43. Multiply: $(3p - 2)^2$

44. Divide: $(12x^3 - 3x^2 + 6x) \div (-3x)$

45. Divide: $(4x^2 - 13x + 15) \div (x - 2)$

- | | |
|---|--|
| <p>46. Factor completely: $-6r^3 s + 8r^2 s^2 - 10rs$</p> <p>48. Factor completely: $k^2 - 4k - 12$</p> <p>50. Factor completely: $9x^2 - 16$</p> <p>52. Factor completely: $3u^3 - 30u^2 + 75u$</p> <p>54. Solve: $x^2 - 7x + 12 = 0$</p> <p>56. Solve: $x^2 = 7x$</p> | <p>47. Factor completely: $3x^3 - 2x^2 + 15x - 10$</p> <p>49. Factor completely: $5x^2 + 8x - 4$</p> <p>51. Factor completely: $4x^2 + 20x + 25$</p> <p>53. Factor completely: $20x^2 - 45$</p> <p>55. Solve: $2x^2 + 5x = 3$</p> <p>57. Solve: $4x^2 = 9$</p> |
|---|--|

58. Solve: $x^2 = 9x + 5$ $\left[\text{Use the Quadratic Formula is } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \right]$

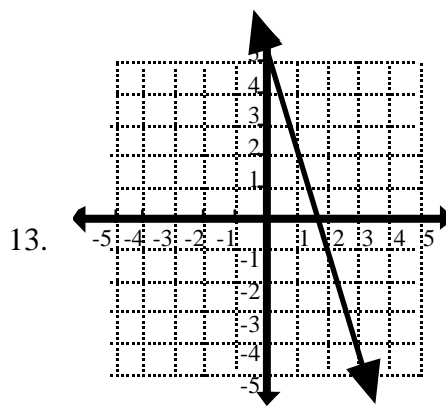
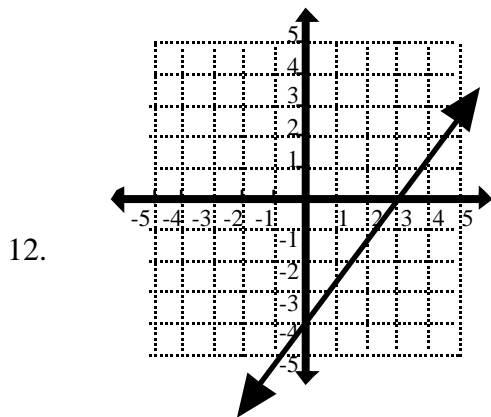


59. Find the length of the unknown side in the triangle shown here:
60. The length of a room is 7 feet longer than its width. The area of the rectangle is 144 square feet. What are the dimensions of the room? What is its perimeter?
61. The length of a room is 6 feet less than three times its width. The perimeter of the rectangle is 72 feet. What are the dimensions of the room?

Answers

(Each answer is preceded or followed by the name of the topic that the problem is most closely associated with. If you get a wrong answer and want additional information on how to do the problem, look for this topic in the index of an elementary algebra textbook.)

- | | |
|--|---|
| <p>1. a) -7 b) -9 c) 20 d) Undefined (signed number arithmetic)</p> <p>2. 30 (order of operations)</p> <p>4. -1 (order of operations)</p> <p>6. $x = \frac{-3}{4}$ (linear equation in one variable)</p> <p>8. $b = 2A - c$ (formulas)</p> <p>10. $m = \frac{3}{5}$ (slope-intercept form)</p> | <p>3. -3 (order of operations)</p> <p>5. $-10x + 40$ (like terms, distributive property)</p> <p>7. $x = 21$ (linear equation in one variable)</p> <p>9. $m = 4$ (slope)</p> <p>11. (a) (-5, 0) (b) (0, 3) (x- and y- intercepts)</p> |
|--|---|



(graphing linear equation in one variable - using intercepts, point and slope)

14. $y = -\frac{2}{3}x + 4$ (slope-intercept form)

15. $y - (-1) = -3(x - 2)$ (point-slope form); $y = -3x + 5$ (slope-intercept form)

16-17. (solve a system of two line. eq. in two vbles) 16. $(x, y) = (8, 10)$ 17. $(x, y) = (2, -3)$

18. $2(n + 7) = n + 3$ (expressions, operations, word problems)

19. Let x = regular price. $x - 0.15x = \$71.40$. $x = \$84$ (percentage decrease)

20. Let x = Will's salary last year. $x + .07x = \$37,450$ $x = \$35,000$. (percentage increase)

(21 & 22 - set up and solve linear equations in one variable, sum of angle of a triangle)

21. Let m = miles driven. $\$107.45 = \$19.95 + \$0.35m$. $m = 250$ miles

22. Let x = size of first angle, $2x$ = size of second angle, $x + 18^\circ$ = size of third angle

$$x + 2x + (x + 18^\circ) = 180^\circ, \quad \text{first} = 40.5^\circ, \quad \text{second} = 81^\circ, \quad \text{third} = 58.5^\circ$$

(23-26 may be done by setting up and solving a single linear equation in one variable, or a system of two linear equations in two variables)

23. Two Variables: If x = hours worked at first job and y = hours worked at second job.

This gives system: $\begin{cases} x + y = 32 \\ 7x + 10y = 278 \end{cases}$ 14 hours at \$7/hr and 18 hours at \$10/hr

One variable: $7x + 10(32 - x) = 278$

24. Two Variables: Let x = rate of car A, y = rate of car B.

This gives system: $\begin{cases} y = x - 10 \\ 3x + 3y = 360 \end{cases}$ car A is going 65 mph, car B is going 55 mph

One variable: $3x + 3(x - 10) = 360$.

25. Two Variables: Let x = amount of ordinary beans, y = amount of special beans.

We get the system:
$$\begin{cases} x + y = 30 \\ \$6.30x + \$8.10y = 30(\$6.90) \end{cases}$$

20 lbs of ordinary beans and 10 pounds of special beans

One variable: $\$6.30x + \$8.10(30 - x) = 30(\$6.90)$

26. Two Variables: Let x = amount invested at 7% and y = amount invested at 10%.

We get the system:
$$\begin{cases} x + y = \$20,000 \\ 0.07x + 0.10y = \$1640 \end{cases}$$

\$12,000 at 7% and \$8000 at 10%

One variable: $0.07x + 0.10(\$20,000 - x) = \1640

27. (Set up and solve proportion) $\frac{25 \text{ miles}}{35 \text{ minutes}} = \frac{125 \text{ miles}}{x \text{ minutes}}$

It will take 175 minutes (or 2 hours, 55 minutes, or 2.92 hours)

Speed is $\frac{5}{7}$ miles/minute or 42.86 mph.

28. (Similar triangles, set up and solve proportion) $\frac{5}{13} = \frac{7}{x}$, $x = \frac{91}{5} = 18\frac{1}{5}$

29. (Reading bar graphs)

a. Technology b. Biography c. Fiction d. 15 e. 65 f. 60%

30. (laws of exponents) $(2x^4 y^2)^3(3xy^2) = (8x^{12} y^6)(3xy^2) = 24x^{13} y^8$

31-33 (negative exponents) 31. $\frac{-12y^3}{x^2}$ 32. $\frac{25r^2}{s^6}$ 33. $5m^4 n^{11}$

34. (scientific notation) a) 2.3×10^{11} b) 7.6×10^{-5}

35. (scientific notation) a) 0.000032 b) 270,000,000,000

36-37 (scientific notation) 36. 1.2×10^3 37. 8×10^{-4}

38-39 (addition/subtraction of polynomials) 38. $2x^2 + 2x - 3$ 39. $-w^2 + 3w + 5$

40-41. (multiplication of polynomials) 40. $10u^2 - 13u - 3$ 41. $6p^3 - 7p^2 + 14p - 8$

42-43. (special product) 42. $4u^2 - 9$ 43. $9p^2 - 12p + 4$

44-45. (division of polynomials)

44. $-4x^2 + x - 2$

45. $4x - 5 + \frac{5}{x - 2}$

46. $-2rs(3r^2 - 4rs + 5)$ (factoring out GCF)

47. $(x^2 + 5)(3x - 2)$ (factoring by grouping)

48. $(k - 6)(k + 2)$ (factoring trinomials)

49. $(5x - 2)(x + 2)$ (factoring trinomials)

50. $(3x + 4)(3x - 4)$ (factoring, diff of sq)

51. $(2x + 5)^2$ (factoring, pfct sq trinomials)

52. $3u(u - 5)^2$ (factoring out GCF, pfct sq trinomials)

53. $5(2x + 3)(2x - 3)$ (factoring out GCF, diff of sq)

54. $x = 3, x = 4$ (Solve quad eq. by factoring)

55. $2x^2 + 5x - 3 = 0, \quad x = \frac{1}{2}, -3$
(Solve quad eq. by factoring)

56. $x^2 - 7x = 0, \quad x = 7, x = 0$
(Solve quad eq. by factoring)

57. $x = \pm \frac{3}{2}$ (using square root principle to solve quadratic equation)

58. $x^2 - 9x - 5 = 0, \quad x = \frac{-(-9) \pm \sqrt{(-9)^2 - 4(1)(-5)}}{2(-1)} = \frac{9 \pm \sqrt{101}}{2}$
(solve quadratic equation by using square root principle)

59. $3^2 + x^2 = 5^2, \quad x = 4$ Unknown side is 4 ft.
(Pythagorean Thm., solve quadratic equation by using square root principle)

60. Let x = width of room, $x + 7$ = length of room. $x(x + 7) = 144$.
Dimensions: 9 ft x 16 ft. Perimeter = $2(9) + 2(16) = 50$ ft.
(Formulas for area and perimeter of rectangle, solving quadratic equation.)

61. Let x = width of room, $3x - 6$ = length of room. $2(3x - 6) + 2x = 72$.
Dimensions: 10.5 ft x 25.5 ft.
(Formulas for perimeter of rectangle, solving linear equation in one variable.)