

APPLICATION
MEDICINE

Young's formula is used to relate a child's dose of a medication to an adult's dose of the same medication. The formula applies to children from 1 to 12 years old.

$$\frac{a}{a+12} \times d = c, \text{ where } \begin{cases} a \text{ represents the child's age} \\ d \text{ represents the adult's dose} \\ c \text{ represents the child's dose} \end{cases}$$

EXAMPLE 4 Solve $\frac{a}{a+12} \times d = c$ for d .

SOLUTION

$$\begin{aligned} \frac{a}{a+12} \times d &= c \\ (a+12) \frac{a}{a+12} \times d &= (a+12)c && \text{Use the Multiplication Property.} \\ ad &= c(a+12) && \text{Simplify and use the Commutative Property.} \\ d &= \frac{c(a+12)}{a} && \text{Use the Division Property.} \end{aligned}$$

CRITICAL THINKING Solve $\frac{a}{a+12} \times d = c$ for a .

CHECKPOINT ✓ Two equations are **equivalent** if they have the same solution.

Use substitution to verify that the following equations are equivalent:

$$86 = \frac{9}{5}C + 32 \qquad 54 = \frac{9}{5}C \qquad C = 30$$

Exercises

Communicate

Tell which **Properties of Equality** you would use to solve each equation.

- $52 = -2.7x - 3$
- $\frac{x}{5} = x + 2.2$
- $x - 5 = -2x - 2$
- Describe one way to obtain an equation that is equivalent to $4x - 7 = 14$.
- Describe how to solve $\frac{2(x+3)}{7} = \frac{9(x-3)}{5}$ by graphing.

Guided Skills Practice

Solve each equation. Check your solution. (**EXAMPLES 1 AND 2**)

- $4x + 12 = 20$
- $\frac{x}{5} + 3 = 4$
- $-\frac{5}{2}x + \frac{5}{2} = 2 - 3x$
- $7 - 6x = 2x - 9$

10 Solve $\frac{4(x+5)}{3} = \frac{-3(x-7)}{5}$ by graphing. (**EXAMPLE 3**)

11 Solve $Ax + By = C$ for y . (**EXAMPLE 4**)

Calculator button indicates that a graphics calculator is recommended.

Practice and Apply

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MB1 Homework Help
for Exercises 6–9, 12–40

Solve each equation.

12. $1 = 2x - 5$

13. $-2x - 7 = 9$

14. $2x - 1 = -5$

15. $3x - 3 = 5$

16. $2x - 5 = 19$

17. $5x - 3 = 12$

18. $20 = 6x - 10$

19. $4 - 5x = 19$

20. $3x + 1 = \frac{1}{2}$

21. $4x + 80 = -6x$

22. $5x + 15 = 2x$

23. $7x = -2x + 5$

24. $5x + 3 = 2x + 18$

25. $-4x - 3 = x + 7$

26. $3x - 8 = 2x + 2$

27. $\frac{1}{5}x + 3 = 2$

28. $\frac{1}{4}x - \frac{5}{2} = -2$

29. $\frac{1}{6}x + \frac{3}{2} = 2$

30. $0 = \frac{1}{2}x + 2$

31. $-\frac{3}{5}x + 12 = 4$

32. $-5 = \frac{3}{2}x - 2$

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

34. $x - 5 = -\frac{3}{2}x + \frac{5}{2}$

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

36. $-2x + 5 = -\frac{1}{3}x - 6$

37. $\frac{2}{3}x - 9 = -\frac{1}{2}x + 4$

38. $\frac{1}{4}x - 3 = 6x$

39. $\frac{1}{3}x - \frac{4}{3} = -\frac{1}{6}x - 1$

40. $\frac{2}{5}x + \frac{6}{5} = x - 3$

Solve each equation by graphing. Give your answers to the nearest hundredth.

41. $0.24x + 1.1 = 2.56x - 1.5$

42. $1.05x - 4.28 = -2.65x + 4.1$

43. $-0.75x + 12.42 = 4.36$

44. $0.35x - 2.72 = 5.83x$

45. $0.67x - 8.75 = -0.48x + 3.99$

46. $5.9(0.33x - 1.33) = -1.03x - 5.72$

Solve each literal equation for the indicated variable.

47. $\frac{1}{2}bh = A$ for b

48. $P = 2l + 2w$ for w

49. $\frac{1}{R} = \frac{1}{r_1} + \frac{1}{r_2}$ for r_2

50. $A = \frac{1}{2}h(b_1 + b_2)$ for b_2

51. $A = \frac{1}{2}h(b_1 + b_2)$ for h

52. $y = \frac{u+1}{u+2}$ for u

53. $ax + b = cx + d$ for x

54. $ax + b = cx + d$ for d

55. $I = P(1 + rt)$ for r

56. $I = P(1 + rt)$ for t

Solve each literal equation for v .

57. $x = vt$

58. $x = vt + \frac{1}{2}at^2$

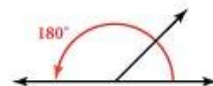
59. $y = \frac{1}{2}xv$

60. Given the equation $y = 4x + 7$, use substitution to solve $-2x + y = 19$ for x .

61. Given the equation $x = -y + 9$, use substitution to solve $3x - 5y = 59$ for x .

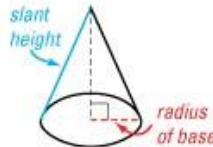
CONNECTIONS

62. **GEOMETRY** The measure of one supplementary angle is 45° more than twice the measure of the other. Write an equation and find the measure of each angle. Recall that two angles are supplementary if the sum of their measures is equal to 180° .



CHALLENGE

63. **GEOMETRY** The formula for the area of a cone in terms of the slant height, s , and the radius of the base, r , is $A = \pi rs + \pi r^2$. Write a formula for the slant height of a cone in terms of its area and the radius of its base.



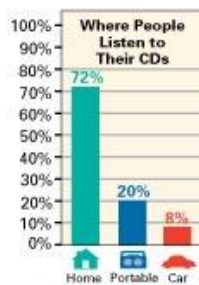
APPLICATIONS

Write and solve an appropriate equation for each situation.

- 64. RECREATION** A summer carnival charges a \$2 admission fee and \$0.50 for each ride. If Tamara has \$10 to spend, how many rides can she go on?
- 65. TAXES** Aaron's mother purchases a new computer for \$1750. If she claims a linear depreciation (loss of value) on the computer at a rate of \$250 per year, how long will it take for the value of the computer to be \$0?
- 66. CONSUMER ECONOMICS** The receipt for repairs on Victor's car is shown at right.
- Write an equation to model the total bill in terms of parts and labor.
 - What hourly rate does the repair shop charge for labor?

AUTO REPAIR		INVOICE
#111 Auto Lane Lona, TX 78787		Date: July 7
ITEM	AMOUNT	
Parts:		
Brake Fluid	\$ 4.00	
Wheel Cylinder	\$28.50	
Rear Brake Shoes	\$20.00	
Front Brake Pads	\$15.00	
Shop Supplies	\$2.50	
Labor	3.5 hours	
TOTAL		\$ 272.00

- 67. INCOME** Louis has two different job offers for a position in shoe sales. One pays \$25 per week plus a \$2 commission for each pair of shoes sold. The second job pays \$40 per week plus a \$1.50 commission for each pair of shoes sold. How many shoes would Louis have to sell to make the same total salary in either job?
- 68. BANKING** Carmen has taken out a loan for \$800 to buy a car. She plans to pay back the loan at a rate of \$40 per month. Ramona has borrowed \$500 to buy a car, which she plans to pay back at a rate of \$20 per month.
- How long will it take Carmen to pay back her loan?
 - How long will it take Ramona to pay back her loan?
 - If Carmen and Ramona take out their loans at the same time, how long will it take for their remaining balances to be equal? What are their remaining balances after this amount of time?
- 69. INCOME** Amelia has a job baby-sitting for a neighbor. She is paid \$20 plus \$2.50 for each hour on the job. If Amelia wants to earn \$40 to buy a new sweater, how many hours would she need to work?



- 70. RECREATION** The results of a survey of CD listeners in 1993 show that 72% usually listen to CDs at home, 20% usually listen to CDs on a portable player, and 8% usually listen to CDs in a car. If 180 of the respondents say that they usually listen to CDs on a portable player, how many people were surveyed?
- 71. INCOME** Anthony wants to buy a used car that will cost \$185.00 per month. If Anthony earns \$5.35 per hour, how many hours must Anthony work each month in order to pay for the car?

Look Back

Identify the slope, m , and y -intercept, b , for each line. Then graph the equation. (LESSON 1.2)

72. $y = 2x - 6$

73. $3x + 4y = 9$

74. $y = 2$

Write each number in decimal notation.

75. 5.736×10^4

76. 7.4609×10^3

77. 46.72×10^6

78. 6.72×10^{-6}

Write each number in scientific notation.

79. 25,000

80. 720,000

81. 260.07

82. 5.7002

83. 0.05

84. 0.0002046

Look Beyond

Explain what each expression means.

85. $y > -5$

86. $-3 < x < 3$

87. $-1 \leq y \leq 1$

88. $x \leq -3$



- Choose a y -value (distance) that is different from those in your portfolio data set. Substitute this y -value into the equation for the least-squares line, and make a prediction about the corresponding time.
- Show your results from Step 1 on your graph.

WORKING ON THE CHAPTER PROJECT

You should now be able to complete the Chapter Project.