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Geometry **Find the value of x.**

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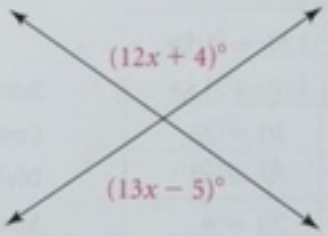

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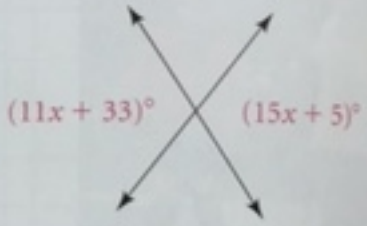

Solve each equation. Check your answer.

3. $6x - 2 = x + 13$

4. $5y - 3 = 2y + 12$

5. $4k - 3 = 3k + 4$

6. $5m + 3 = 3m + 9$

7. $8 - x = 2x - 1$

8. $2n - 5 = 8n + 7$

9. $3a + 4 = a + 18$

10. $6b + 14 = -7 - b$

11. $5a - 14 = -5 + 8a$

12. $3 + 4x = 3x + 6$

13. $30 - 7z = 10z - 4$

14. $8x - 3 = 7x + 2$

15. $-36 + 2w = -8w + w$

16. $4p - 10 = p + 3p - 2p$

Write and solve an equation for each situation. Check the reasonableness of your solution.

17. Telephone Service One telephone company charges $16.95 per month and $.05 per minute for local calls. Another company charges $22.95 per month and $.02 per minute for local calls. For what number of minutes of local calls per month is the cost of the plans the same?

18. Fitness One health club charges a $44 sign-up fee and $30 per month. Another health club charges a $99 sign-up fee and $25 per month. For what number of months is the cost the same?

19. Carpentry Peter was building a porch. Placing boards of equal length from end to end, Peter found that 4 boards were 3 ft too long for the porch length, while 3 boards were 5 ft too short. How long was each board?

20. Flying You and a pilot friend decide to rent an airplane to do some sightseeing. One service charges $100 plus $80 per hour, while another charges $250 plus $70 per hour for the same airplane. At what number of hours is the cost the same?

21. a. Use the equation $9 - 6x = 3(3 - 2x)$. Substitute four different values for x and simplify.
b. What kind of equation is $9 - 6x = 3(3 - 2x)$?

Determine whether each equation is an *identity* or whether it has *no solution*.

22. $14 - (2q + 5) = -2q + 9$

23. $6x + 1 = 6x - 8$

24. $-8x + 14 = -2(4x - 7)$

25. $y - 5 = -(5 - y)$

26. $a - 4a = 2a + 1 - 5a$

27. $9x + 3x - 10 = 3(3x + x)$

Solve each equation. If the equation is an identity, write *identity*. If it has no solution, write *no solution*.

28. $18x - 5 = 3(6x - 2)$

29. $9 + 5a = 2a + 9$

30. $3(x - 4) = 3x - 12$

31. $6x = 4(x + 5)$

32. $\frac{3}{5}k - \frac{1}{10}k = \frac{1}{2}k + 1$

33. $0.5y + 2 = 0.8y - 0.3y$

34. $5m - 2(m + 2) = -(2m + 15)$

35. $\frac{7}{8}w = \frac{4}{8}w + \frac{6}{8}w$

36. $0 = 0.98b + 0.02b - b$

37. $6(6g - 2) + 8(1 - 5g) = 2g$

38. Business A toy company spends $1500 each day for factory expenses plus $8 per teddy bear, like the one shown at left. How many bears must the company sell in one day to equal its daily costs? Write an equation and solve.

39. Business A company manufactures tote bags. The company spends $1200 each day for overhead expenses plus $9 per tote bag for labor and materials. The tote bags sell for $25 each. How many tote bags must the company sell each day to equal its daily costs for overhead, labor, and materials? Write an equation and solve.

Find the value of each variable.

40. $\begin{bmatrix} 2x + 1 & a - 1 \\ w - 4 & 9y \end{bmatrix} = \begin{bmatrix} -5x - 6 & 5a \\ 3w + 4 & -3y \end{bmatrix}$

41. $\begin{bmatrix} a + 1 & 4b \\ 2c + 3 & 5d - 3 \end{bmatrix} = \begin{bmatrix} 7 - a & 3b + 5 \\ 3c - 4 & 63 - d \end{bmatrix}$

Find the value of each variable.

42. $\begin{bmatrix} 0.5x + 3 & w + 1.5 \\ 2.5y + 2.5 & a + 1 \end{bmatrix} = \begin{bmatrix} x + 0.5 & 2w - 1.5 \\ 5y - 2.5 & 19 - a \end{bmatrix}$

43. $\begin{bmatrix} \frac{1}{2} + a & \frac{1}{2}b + 2 \\ c - \frac{1}{3} & \frac{1}{3}d + \frac{2}{3} \end{bmatrix} = \begin{bmatrix} 6\frac{1}{2} - a & b - 1 \\ 4\frac{2}{3} & d + \frac{4}{9} \end{bmatrix}$

Error Analysis **Find the mistake in the solution of each equation. Explain the mistake and solve the equation correctly.**

44.
$$\begin{aligned} 2x &= 11x + 45 \\ 2x - 11x &= 11x - 11x + 45 \\ 9x &= 45 \\ \frac{9x}{9} &= \frac{45}{9} \\ x &= 5 \end{aligned}$$

45.
$$\begin{aligned} 4.5 - y &= 2(y - 5.7) \\ 4.5 - y &= 2y - 11.4 \\ 4.5 - y - y &= 2y - y - 11.4 \\ 4.5 &= y - 11.4 \\ 4.5 + 11.4 &= y - 11.4 + 11.4 \\ 15.9 &= y \end{aligned}$$

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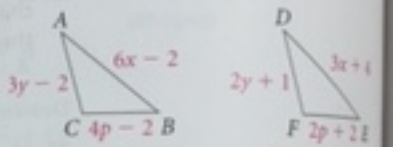
46. **Geometry** $\triangle ABC$ is congruent to $\triangle DEF$. Find the lengths of the sides of $\triangle DEF$.



47. **Writing** Is an equation that has 0 for a solution the same as an equation with no solution? Explain.

48. **Spreadsheet** Don set up a spreadsheet to solve $5(x - 3) = 4 - 3(x + 1)$.
   a. Does Don's spreadsheet show a solution to the equation?
   b. Between which two values of x is the solution to the equation? How do you know?
   c. For what values of x is $4 - 3(x + 1)$ less than $5(x - 3)$?

	A	B	C
1	x	$5(x - 3)$	$4 - 3(x + 1)$
2	−5	−40	16
3	−3	−30	10
4	−1	−20	4
5	1	−10	−2
6	3	0	−8

Challenge **Open-Ended** **Write an equation with a variable on each side such that you get the solution described.**

49. $x = 0$

50. x is a positive number.

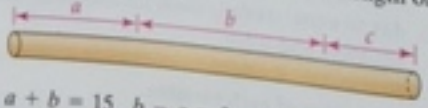
51. x is a negative number.

52. All values of x are solutions.

53. No values of x are solutions.

54. $x = 1$

55. Use the equations below to find the length of the pipe.



$a + b = 15 \quad b - a = 3 \quad a + b - 12 = c$

56. **Geometry** The perimeters of the rectangles at the right are equal. Find the length and width of each rectangle.