Chapter 1

Solve the equation. Justify each step.

Answers

1. $x + \dfrac{2}{3} = \dfrac{5}{6}$ $x = \dfrac{5}{6} \cdot \dfrac{2}{3}$

   $-\dfrac{2}{3} \quad -\dfrac{2}{3}$ $x = \dfrac{5}{6} - \dfrac{4}{6} = \dfrac{1}{6}$

2. $w - 8 = 12$

   $+8 \quad +8$

   $w = 20$

1. $\dfrac{1}{6}$

2. 20

Solve the equation. Determine whether the equation has *one solution*, *no solution*, or *infinitely many solutions*.

3. $\dfrac{6m}{6} = \dfrac{-72}{6}$ $m = -12$

4. $\dfrac{3 \cdot n}{3} = 15 \cdot 3$ $n = 45$

5. $5 + 2y = -13 + 2y$ $-2y \qquad -2y$ $5 = -13$

6. $4h - 6 = 12$ $\dfrac{4h}{4} = \dfrac{18}{4}$ $+6 \quad +6$ $4h = 18$

7. $5 - k = 8 - k - 3$ $5 - k = 5 - k$ $+k \qquad +k$ $5 = 5$

8. $3x + 5 - 2x + 10 - x = 0$ $0x + 15 = 0 \quad 15 \neq 0$

9. $6(3 - d) + 2d = 24$ $18 - 6d + 2d = 24$ $18 - 4d = 24$ $-18 \qquad -18$ $\dfrac{-4d}{-4} = \dfrac{6}{-4}$

10. $\dfrac{1}{4}w + \dfrac{1}{2}w + 5 = 11$ $\dfrac{3}{4}w + 5 = 11$ $-5 \quad -5$

3. -12

4. 45

5. NS

6. $\dfrac{18}{4} = \dfrac{9}{2}$ or 4.5

7. $1M$

8. NS

9. $-\dfrac{6}{4} = -\dfrac{3}{2}$ or -1.5

10. 8

Describe the value of *c* for which the equation is an identity. $\dfrac{3}{4}w = 6 \cdot \dfrac{4}{3} \quad w = \dfrac{24}{3}$

11. $2(x + 5) = 2(x + 3) + c$ $2x + 10 = 2x + 6 + c$ $-2x \qquad -2x$ $10 = 6 + c$ $\dfrac{-6}{4} = \dfrac{-6}{c}$ $4 = c$

12. $|2x + 5| = |cx + 3 - 4x + 2|$ $2x + 5 = cx - 4x + 5 \quad 2x = cx - 4x$ $-5 \qquad +4x \quad +4x$ $6x = cx \quad \dfrac{6x}{x} = \dfrac{cx}{x}$

Find the value of the variable. Then find the angle measures of the polygon.

13.

$3x + 2x + 10 + 2x + 5 + 2x - 15 = 360$

$9x + 0 = 360$

$\dfrac{9x}{9} = \dfrac{360}{9}$

$x = 40$

$3(40) = 120$

$2(40) + 10 = 90$

$2(40) + 5 = 85$

$2(40) - 15 = 65$

$(2x + 10)°$
$(2x + 5)°$
$(2x - 15)°$

Sum of angle measures: $360°$

14.

$2x + 2(x - 1) + 5x + 2 = 180$

$2x + 2x - 2 + 5x + 2 = 180$

$9x + 0 = 180$

$\dfrac{9x}{9} = \dfrac{180}{9}$

$x = 20$

$2(20 - 1) = 38 \quad 5(20) + 2 = 102$

$2(20) = 40$

$2x°$
$2(x - 1)°$
$(5x + 2)°$
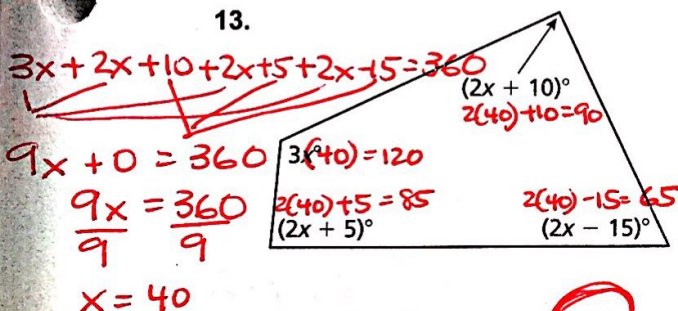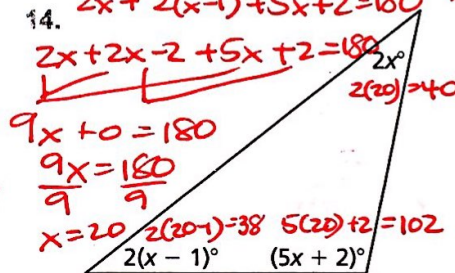
Sum of angle measures: $180°$

11. 4

12. 6

13. $x = 40$

$120, 90, 85, 65$

14. $x = 20$

$38, 40, 102$

Solve the equation.

15. $2n - 3 = 6n + 9$ $-2n \qquad -2n$ $-3 = 4n + 9$ $-9 \qquad -9$ $\dfrac{-12}{4} = \dfrac{4n}{4}$ $-3 = n$

16. $\dfrac{1}{2}(6x + 2) = 5(x + 3)$ $3x + 1 = 5x + 15$ $-3x \qquad -3x$ $1 = 2x + 15$ $-15 \quad -15$ $\dfrac{-14}{2} = \dfrac{2x}{2}$

17. $\dfrac{2}{3}(w + 12) = 3w - 6$ $\dfrac{2}{3}w + 8 = 3w - 6$ $-\dfrac{2}{3}w \qquad -\dfrac{2}{3}w$ $8 = \dfrac{7}{3}w - 6$ $+6 \qquad +6$ $\dfrac{3 \cdot 14}{7} = \dfrac{7}{3} \cdot \dfrac{3}{7}w$ $\dfrac{42}{7} = w$ $6 = w$

18. $|m + 8| = 12$ $m + 8 = 12 \qquad m + 8 = -12$ $-8 \quad -8 \qquad -8 \quad -8$ $m = 4 \qquad m = -20$

19. $|5y + 2| = 7y$ ⑲ $5y + 2 = 7y \qquad 5y + 2 = -7y$ $-5y \quad -5y \qquad -5y \qquad -5y$ $\dfrac{2}{2} = \dfrac{2y}{2} \qquad \dfrac{2}{-12} = \dfrac{-12y}{-12}$ $1 = y \qquad -\dfrac{1}{6} = y$ extraneous

20. $|4k + 5| = |3k - 2|$ ⑳ $4k + 5 = 3k - 2 \qquad 4k + 5 = -3k + 2$ $-3k \quad -3k \qquad +3k \qquad +3k$ $k + 5 = -2 \qquad 7k + 5 = 2$ $-5 \quad -5 \qquad -5 \quad -5$ $k = -7 \qquad \dfrac{7k}{7} = \dfrac{-3}{7}$

15. -3

16. -7

17. 6

18. $4, -20$

19. 1

20. $-7, -\dfrac{3}{7}$

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Chapter 1

Solve the literal equation for y.

21. $3x + 2y = 12$ $-3x$

$\frac{3x}{2}$ $\frac{2}{2}$ $\frac{2}{2}$

$y = 6 - \frac{3}{2}x$

22. $7x - 4y = 3y - 14$

$+4y$ $+4y$

$7x = 7y - 14$

$\frac{7x + 14}{7} = \frac{7y}{7}$

$x + 2 = y$

Answers

21. $y = 6 - \frac{3}{2}x$

22. $x + 2 = y$

23. The volume V of a cone is given by the formula $V = \frac{1}{3}\pi r^2 h$, where r is the radius of the base and h is the height.

$3V = \frac{3}{1} \cdot \frac{1}{3}\pi r^2 h$

$\frac{3V}{\pi r^2} = \frac{\pi r^2 h}{\pi r^2}$

a. Solve the formula for height h.

b. A cone has a volume of 120π cubic centimeters and a radius of 6 centimeters. What is the height of the cone?

$h = \frac{3V}{\pi r^2} = \frac{3(120\pi)}{\pi (6)^2} = \frac{360\pi}{36\pi}$

23. a. $h = \frac{3V}{\pi r^2}$

b. 10

24. A rectangular garden has a length that is five less than twice the width. The garden perimeter is 50 meters. What are the dimensions of the garden?

24. $w = 10$
$\ell = 15$

25. A necklace chain costs $15. Beads cost $2.75 each. You spend a total of $28.75 on a necklace and beads before tax. How many beads did you buy in addition to the necklace?

25. 5

26. Consider the equation $\left|\frac{1}{4}x + 12\right| = \frac{x}{2}$. Without calculating, how do you know $x = -16$ is an extraneous solution?

26. b/c $\frac{-16}{2} = -8$ and an ab. val. equation cannot equal a negative

27. Your soccer team wants to buy T-shirts. You call two different companies about prices. Each company charges a price per T-shirt and a set-up fee to create the team logo.

a. The total cost is the same for each company. How many T-shirts is the team buying?

b. A few players decide not to get T-shirts. Which company has a lower cost?

27. a. 15

b. COMP A.

	Logo set-up fee	Price per T-Shirt(s)
Company A	$50	$15
Company B	$95	$12

$50 + 15s$
$95 + 12s$

(a) $50 + 15s = 95 + 12s$
$-12s$ $-12s$
$50 + 3s = 95$
-50 -50
$\frac{3s}{3} = \frac{45}{3}$
$s = 15$

(b) FOR PART B CHOOSE A LESSER NUMBER OF SHIRTS THAN 15. & PLUG INTO BOTH EQUATIONS

$50 + 15(10)$ $95 + 12(10)$
$50 + 150$ $95 + 120$
200 215
$\uparrow$
CHEAPER

24.
$w + 2w - 5 + w + 2w - 5$

$6w - 10 = 50$
$+10$ $+10$
$\frac{6w}{6} = \frac{60}{6}$
$w = 10$

$2w - 5$

$\ell = 2(10) - 5$
$\ell = 20 - 5$
$\ell = 15$

(25)
total = chain + cost per bead
total = $15 + 2.75b$
$28.75 = 15 + 2.75b$
-15 -15
$\frac{13.75}{2.75} = \frac{2.75b}{2.75}$
$5 = b$

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