Algebra Book Answers

8 Solving equations

1. a) $2y = 8$ $\div 2$ both sides

$$\frac{2y}{2} = \frac{8}{2}$$

$$y = 4$$

b) $t - 4 = 7$

$$t = 7 + 4 = 11$$

c) $7y = 54$ $\div 7$ both sides

$$y = \frac{54}{7}$$

d) $2t - 5 = 9$

$$2t = 9 + 5$$

$$2t = 14 \quad \div 2 \text{ both sides}$$

$$t = 7$$

2. a) $5g + 3 = 18$

$$5g = 15 \rightarrow g = 3$$

b) $y + 5 = 12$

$$y = 12 - 5 = 7$$

c) $\dfrac{2x}{4} = 3$ $\times 4$ both sides

$$2x = 3 \times 4$$

$$2x = 12 \quad \div 2 \text{ both sides}$$

$$x = \frac{12}{2} = 6$$

d) $\dfrac{5h}{2} = 10$ $\times 2$ both sides

$$5h = 10 \times 2$$

$$5h = 20 \quad \div 5 \text{ both sides}$$

$$h = \frac{20}{5} = 4$$

3. $3x + 1 = x + 9$

$$3x - x = 9 - 1$$

$$2x = 8 \quad \div 2 \text{ both sides}$$

$$x = \frac{8}{2} = 4$$

4. $5t - 4 = 3t + 6$

$$5t - 3t = 6 + 4$$

$$2t = 10 \quad \div 2$$

$$t = 5$$

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5. $4y + 3 = y + 6$

$\quad 4y - y = 6 - 3$

$\quad\quad 3y = 3 \quad \div 3$

$\quad\quad y = 1$

6. $2y + 17 = 6y + 5$

$\quad -5 + 17 = 6y - 2y$

$\quad 6y - 2y = -5 + 17$

$\quad\quad 4y = 12 \quad \div 4$

$\quad\quad y = 3$

7. $5(y+1) = 3y + 13$

$\quad 5y + 5 = 3y + 13$

$\quad 5y - 3y = 13 - 5$

$\quad\quad 2y = 8 \rightarrow y = 4$

8. $3y + 10 = 5(y+4)$

$\quad 3y + 10 = 5y + 20$

$\quad 5y - 3y = 10 - 20$

$\quad\quad 2y = -10 \quad \div 2$

$\quad\quad y = -5$

9. a) $4K + 10 = 3K + 15$

b) $7K - 3 = 5K + 2$

$\quad 7K - 5K = 2 + 3$

$\quad\quad 2K = 5 \quad \div 2$

$\quad\quad K = \dfrac{5}{2} \ \underline{or} \ 2.5$

10. No

$\quad x + 30 = 100$

$\quad x = 100 - 30$

$\quad x = 70$

11. $\dfrac{b+1}{2} = 5 \qquad \times$

$\quad b + 1 = 10$

$\quad b = 10 - 1$

$\quad b = 9$

12. $a = 1 , b = 5$

$\quad a = 2 , b = 6$

"Many possible answers"

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13. a) $6y + 1 = 4y + 7$

$6y - 4y = 7 - 1$

$2y = 6 \quad \div 2$

$y = 3$

b) $K = 1$

14. a) $5y - 8 = 3y + 5$

$5y - 3y = 5 + 8$

$2y = 13 \quad \div 2$

$y = \frac{13}{2}$ or 6.5

b) $5y - 8 = 2(3y + 5)$

$5y - 8 = 6y + 10$

$6y - 5y = -8 - 10$

$y = -18$

15. $a = 34$

$b = 8$

$c = 4$

16. a) $K = a + b$

$\underbrace{a + b}_{\downarrow} + K = 30$

K

$K + K = 30$

$2K = 30 \quad \div 2$

$K = 15$

b) $c = 5.5$

c) e is less than 10

e is greater than 5

17. $\frac{5(3y - 4)}{2y} = 7 \qquad \times 2y$

$5(3y - 4) = 7 \times 2y$

$15y - 20 = 14y$

$15y - 14y = 20$

$y = 20$

18. a) $n + 3 = 12$

$n = 12 - 3 = 9$

so, $n - 3 = 9 - 3 = \underline{6}$

b) $n + 3 = 7 \rightarrow n = 4$

so, $n - 6 = 4 - 6 = \underline{-2}$

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19. a) $T = 10 \times 20$

$\qquad = 200 \, £$

b) $N \times 20 = T \qquad \div 20$

$\qquad N = \dfrac{T}{20} = \dfrac{280}{20}$

$\qquad N = 14 \text{ days}$

20. i) $2n + 1 = 7$

ii) $2n + 1 = 7$

$\qquad 2n = 6 \quad \div 2$

$\qquad n = 3$

so, we can say $\quad 7n = 21$

21. $2x + 6y = 32$

$\qquad \dfrac{x + 3y}{8} = 2$

$\qquad \sqrt{x + 3y} = 4$

22. $6x + 1 = 9$

$\qquad (1 - 2y)^2 = 100$

23. a) $\dfrac{8x + 10z + 6}{2}$

$= \dfrac{1}{2}(8x + 10z + 6)$

$= \left(\dfrac{1}{2} \times 8x\right) + \left(\dfrac{1}{2} \times 10z\right) + \left(\dfrac{1}{2} \times 6\right)$

$= \dfrac{8x}{2} + \dfrac{10z}{2} + \dfrac{6}{2}$

$= 4x + 5z + 3$

b) $\dfrac{9x^2y + xy}{xy}$

$= \dfrac{1}{xy}(9x^2y + xy)$

$= \left(\dfrac{1}{xy} \times 9x^2y\right) + \left(\dfrac{1}{xy} \times xy\right)$

$= \dfrac{9x^2y}{xy} + \dfrac{xy}{xy}$

$= 9x + 1$

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24. 1st side = 13 cm

2nd side = $(y+8)$ cm

3rd side = $(3y+1)$ cm

• An isoscles triangle must have 2 equal sides

• Assume 1st and 2nd side : (1st answer)

$y+8 = 13$ (1st and 2nd side = 13 cm)

$y = 13 - 8 = 5$

so, the 3rd side = $3(5) + 1 = 16$ cm

• Assume 1st and 3rd side are equal (2nd answer)

$3y + 1 = 13$ (1st and 3rd side = 13 cm)

$3y = 12$

$y = 4$

so, 2nd side = $4 + 8 = 12$ cm

• Assume 2nd and 3rd side are equal (3rd answer)

$3y + 1 = y + 8$

$3y - y = 8 - 1$

$2y = 7 \longrightarrow y = \frac{7}{2}$ or 6.5

so, 2nd and 3rd side = $6.5 + 8$

= 14.5 cm

✱ To sum up :

13 cm, 13 cm, 16 cm

13 cm, 12 cm, 13 cm

13 cm, 14.5 cm, 14.5

(20)