



Write an equation and solve it to find the number. (2 marks)

16. B+ Equations (248881)

Verity and three of her friends won x dollars in a lottery. When the money was divided evenly between the four friends they each received **\$124 500**.

Write an equation and solve it to find out the total amount of their lottery winnings. (2 marks)

17. B+ Equations (248892)

A square with side length x has an area of **81 cm²**.

Write an equation and solve it to find the side length. (2 marks)

18. B+ Equations (249694)

A rectangle has a length of **12** and its area is 96. Find its width. (2 marks)

19. B+ Equations (249697)

An isosceles triangle has a perimeter of **46** and its base is 12. Find the length of its equal sides. (2 marks)

20. B+ Equations (249687)

Solve $\frac{2n + 3}{2} = -1$. (2 marks)

21. A Equations (248897)

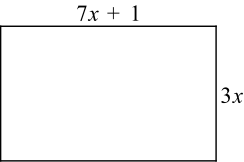
Solve $2x + 3 = 9$ (2 marks)

22. A Equations (248903)

Solve $\frac{g}{4} + 2 = 7$ (2 marks)

23. A Equations (249700)

Write an algebraic equation for the perimeter of the rectangle below and use it to calculate the value of x given the perimeter is **62**. (2 marks)



24. A Equations (250075)

Solve the quadratic equation $x^2 + 3 = 147$ for $x < 0$. (2 marks)

25. A Equations (250072)

Solve the quadratic equation $x^2 - 1 = 48$ for $x > 0$. (2 marks)

26. A Equations (249622)

Find the value of t in the formula $v = u + at$ if $v = 10$, $u = 3$ and $a = 2$. (2 marks)

27. A Equations (248899)

Solve $3m - 8 = -26$ (2 marks)

28. A Equations (248901)

Solve $10 - 7y = -11$ (2 marks)

29. A Equations (248910)

Solve $8 - \frac{x}{9} = -1$ (2 marks)

30. A Equations (248915)

Solve $\frac{q - 4}{2} = 6$ (2 marks)

31. A Equations (248920)

Solve $4c - 5.4 = -7$ (2 marks)

32. A Equations (248928)

Solve $2x + 3 = 4x$. (2 marks)

33. A Equations (250090)

Find the value of c in the formula $c^2 = a^2 + b^2$ given $a = 7$ and $b = 24$. Assume c is positive. (2 marks)

34. A Equations (250082)

Find the value of r in the formula $A = \pi r^2$ given $A = 10$. Assume r is positive and give your answer correct to 1 decimal place. (2 marks)

35. A Equations (248926)

Solve $\frac{x + 4}{3} = 2$. (2 marks)

36. A Equations (248918)

Solve $10b - 3 = -2$ (2 marks)

37. A Equations (248913)

Solve $\frac{x+1}{3} = -4$ (2 marks)

38. A Equations (248922)

3 is subtracted from a quarter of x and the result is $-\frac{1}{2}$.

Write an equation and solve it algebraically to find the value of x . (3 marks)

39. A Equations (248934)

Verify that $x = 1.5$ is a solution of the equation $\frac{2x}{3} + 3 = 4$. (2 marks)

40. A Equations (248939)

Verify that $x = 7$ is a solution of the equation $\frac{x-3}{2} = 2$. (2 marks)

41. A Equations (249629)

Two consecutive integers have a sum of 25.

a. Given the first number is x , write an algebraic equation to represent this information. (2 marks)

b. Solve your equation algebraically to find the two numbers. (2 marks)

42. A Equations (250094)

Find the value of c in the formula $c^2 = a^2 + b^2$ given $a = 12$ and $b = 14$. Assume c is positive and give your answer correct to 2 decimal places. (2 marks)

43. A Equations (249639)

Two consecutive integers have a sum of 147.

a. Given the first number is x , write an algebraic equation to represent this information. (2 marks)

b. Solve your equation algebraically to find the two numbers. (2 marks)

44. A Equations (248941)

Verify that $x = 0.3$ is a solution of the equation $8x + 0.5 = 2.9$. (2 marks)

45. A Equations (248937)

Verify that $x = \frac{3}{4}$ is a solution of the equation $4x - 5 = -2$. (2 marks)

46. A Equations (248930)

Verify that $x = 2$ is a solution of the equation $2x + 3 = 7$. (2 marks)

Worked Solutions

1. **B** Equations (250061)

a. $x^2 = 8$
 $\sqrt{x^2} = \pm \sqrt{8}$
 $x = \pm 2.828\dots = \pm 2.8$

b. $x^2 = 323$
 $\sqrt{x^2} = \pm \sqrt{323}$
 $x = \pm 17.972\dots = \pm 18.0$

2. **B** Equations (250056)

a. $x^2 = 25$
 $\sqrt{x^2} = \pm \sqrt{25}$
 $x = \pm 5$

b. $x^2 = 289$
 $\sqrt{x^2} = \pm \sqrt{289}$
 $x = \pm 17$

3. **B** Equations (249648)

$$\frac{3x}{4} = 9$$
$$3x = 9 \times 4$$
$$3x = 36$$
$$x = 12$$

4. **B** Equations (249641)

$$\frac{2x}{3} = 10$$
$$2x = 10 \times 3$$
$$2x = 30$$
$$x = 15$$

Worked Solutions

5. **B** Equations (249658)

$$\frac{2x}{7} = 1$$
$$2x = 1 \times 7$$
$$2x = 7$$
$$x = \frac{7}{2} = 3\frac{1}{2}$$

6. **B** Equations (249654)

$$\frac{5x}{3} = 1$$
$$5x = 1 \times 3$$
$$5x = 3$$
$$x = \frac{3}{5}$$

7. **B** Equations (249683)

$$\frac{2x}{3} = -8$$
$$2x = -8 \times 3$$
$$2x = -24$$
$$x = -12$$

8. **B** Equations (250065)

a. $A = s^2$
 $A = 36$ (given)
 $\therefore s^2 = 36$
 $\sqrt{s^2} = \sqrt{36}$
 $s = 6$

Side length = 6 m

b. Perimeter = $4 \times s$
 $= 4 \times 6$
 $= 24$

Perimeter = 24 m

9. **B** Equations (250070)

a. $A = s^2$
 $A = 121$ (given)
 $\therefore s^2 = 121$
 $\sqrt{s^2} = \sqrt{121}$
 $s = 11$

Side length = 11 cm

b. Perimeter = $4 \times s$
 $= 4 \times 11$
 $= 44$

Perimeter = 44 cm

10. **B** Equations (249692)

$$c = \sqrt{a^2 + b^2}$$
$$c = \sqrt{12^2 + 5^2}$$
$$c = \sqrt{144 + 25}$$
$$c = \sqrt{169}$$
$$c = 13$$

11. **B** Equations (249685)

$$\frac{3x}{5} - 8 = 1$$
$$\frac{3x}{5} = 1 + 8$$
$$\frac{3x}{5} = 9$$
$$3x = 9 \times 5$$
$$3x = 45$$
$$x = 15$$

12. **B+** Equations (248885)

$$3w = 141$$
$$w = \frac{141}{3}$$
$$w = 47$$

$\therefore$ The number is 47

13. **B+** Equations (249660)

$$2a + 3b = c$$
$$2a + 3 \times 2 = 10$$
$$2a + 6 = 10$$
$$2a = 4$$
$$a = 2$$

14. **B+** Equations (249705)

$$3(x - 1) = 24$$
$$3 \times x + 3 \times -1 = 24$$
$$3x - 3 = 24$$
$$3x = 27$$
$$x = \frac{27}{3}$$
$$x = 9$$

15. **B+** Equations (248890)

$$\frac{p}{2} = 125.6$$
$$p = 2 \times 125.6$$
$$p = 251.2$$

$\therefore$ The number is 251.2

16. **B+** Equations (248881)

$$\frac{x}{4} = 124\,500$$
$$x = 4 \times 124\,500$$
$$x = 498\,000$$

$\therefore$ The amount of their total winnings was \$498 000

17. **B+** Equations (248892)

$$x^2 = 81$$
$$x = \sqrt{81}$$
$$x = 9$$

$\therefore$ The number side length is 9 cm

18. **B+** Equations (249694)

$$\begin{aligned}A &= l \times w \\ 96 &= 12 \times w \\ 12w &= 96 \\ w &= \frac{96}{12} \\ w &= 8\end{aligned}$$

19. **B+** Equations (249697)

$$\begin{aligned}P &= 2l + b \\ 46 &= 2l + 12 \\ 2l &= 34 \\ l &= \frac{34}{2} \\ l &= 17\end{aligned}$$

20. **B+** Equations (249687)

$$\begin{aligned}\frac{2n + 3}{2} &= -1 \\ 2n + 3 &= -1 \times 2 \\ 2n + 3 &= -2 \\ 2n &= -5 \\ n &= \frac{-5}{2} \\ n &= -2\frac{1}{2}\end{aligned}$$

21. **A** Equations (248897)

$$\begin{aligned}2x + 3 &= 9 \\ 2x &= 9 - 3 \\ 2x &= 6 \\ x &= \frac{6}{2} \\ x &= 3\end{aligned}$$

22. **A** Equations (248903)

$$\begin{aligned}\frac{g}{4} + 2 &= 7 \\ \frac{g}{4} &= 7 - 2 \\ \frac{g}{4} &= 5 \\ g &= 5 \times 4 \\ g &= 20\end{aligned}$$

23. **A** Equations (249700)

$$\begin{aligned}P &= 2l + 2w \\ 62 &= 2(7x + 1) + 2 \times 3x \\ 62 &= 2 \times 7x + 2 \times 1 + 6x \\ 62 &= 14x + 2 + 6x \\ 20x + 2 &= 62 \\ 20x &= 60 \\ x &= 3\end{aligned}$$

24. **A** Equations (250075)

$$\begin{aligned}x^2 + 3 &= 147 \\ x^2 &= 147 - 3 \\ x^2 &= 144 \\ \sqrt{x^2} &= \sqrt{144} \\ x &= \pm 12\end{aligned}$$

Now $x < 0 \therefore x = -12$

25. **A** Equations (250072)

$$\begin{aligned}x^2 - 1 &= 48 \\ x^2 &= 48 + 1 \\ x^2 &= 49 \\ \sqrt{x^2} &= \sqrt{49} \\ x &= \pm 7\end{aligned}$$

Now $x > 0 \therefore x = 7$

26. **A** Equations (249622)

$$\begin{aligned}v &= u + at \\ 10 &= 3 + 2t \\ 2t &= 10 - 3 \\ 2t &= 7 \\ t &= 3.5\end{aligned}$$

27. **A** Equations (248899)

$$\begin{aligned}3m - 8 &= -26 \\ 3m &= -26 + 8 \\ 3m &= -18 \\ m &= \frac{-18}{3} \\ m &= -6\end{aligned}$$

28. **A** Equations (248901)

$$\begin{aligned}10 - 7y &= -11 \\ -7y &= -11 - 10 \\ -7y &= -21 \\ y &= \frac{-21}{-7} \\ y &= 3\end{aligned}$$

29. **A** Equations (248910)

$$\begin{aligned}8 - \frac{x}{9} &= -1 \\ \frac{-x}{9} &= -1 - 8 \\ \frac{-x}{9} &= -9 \\ -x &= -9 \times 9 \\ -x &= -81 \\ x &= 81\end{aligned}$$

30. **A** Equations (248915)

$$\begin{aligned}\frac{q - 4}{2} &= 6 \\ q - 4 &= 6 \times 2 \\ q - 4 &= 12 \\ q &= 12 + 4 \\ q &= 16\end{aligned}$$

31. **A** Equations (248920)

$$\begin{aligned}4c - 5.4 &= -7 \\ 4c &= -7 + 5.4 \\ 4c &= -1.6 \\ c &= \frac{-1.6}{4} \\ c &= -0.4\end{aligned}$$

32. **A** Equations (248928)

$$\begin{aligned}2x + 3 &= 4x \\ 3 &= 4x - 2x \\ 3 &= 2x \\ 2x &= 3 \\ x &= \frac{3}{2}\end{aligned}$$

33. **A** Equations (250090)

$$\begin{aligned}c^2 &= a^2 + b^2 \\ c^2 &= 7^2 + 24^2 \\ c^2 &= 49 + 576 \\ \sqrt{c^2} &= \sqrt{525} \\ c &= 25\end{aligned}$$

34. **A** Equations (250082)

$$\begin{aligned}A &= \pi r^2 \\ \pi r^2 &= 10 \\ r^2 &= \frac{10}{\pi} \\ \sqrt{r^2} &= \sqrt{\frac{10}{\pi}} \\ r &= 1.784\dots \\ &\approx 1.8 \text{ (1 d.p.)}\end{aligned}$$

35. **A** Equations (248926)

$$\begin{aligned}\frac{x+4}{3} &= 2 \\ x+4 &= 2 \times 3 \\ x+4 &= 6 \\ x &= 6-4 \\ x &= 2\end{aligned}$$

36. **A** Equations (248918)

$$\begin{aligned}10b-3 &= -2 \\ 10b &= -2+3 \\ 10b &= 1 \\ b &= \frac{1}{10} \\ b &= 0.1\end{aligned}$$

37. **A** Equations (248913)

$$\begin{aligned}\frac{x+1}{3} &= -4 \\ x+1 &= -4 \times 3 \\ x+1 &= -12 \\ x &= -12-1 \\ x &= -13\end{aligned}$$

38. **A** Equations (248922)

$$\begin{aligned}\frac{x}{4}-3 &= -\frac{1}{2} \\ \frac{x}{4} &= -\frac{1}{2}+3 \\ \frac{x}{4} &= 2\frac{1}{2} \\ x &= 4 \times 2\frac{1}{2} \\ x &= 10\end{aligned}$$

39. **A** Equations (248934)

When $x = 1.5$

$$\begin{aligned}LHS &= \frac{2x}{3} + 3 \\ &= \frac{2 \times 1.5}{3} + 3 \\ &= 1 + 3 = 4 \\ &= RHS\end{aligned}$$

$\therefore x = 1.5$ is a solution

40. **A** Equations (248939)

When $x = 7$

$$\begin{aligned}LHS &= \frac{x-3}{2} \\ &= \frac{7-3}{2} \\ &= \frac{4}{2} = 2 \\ &= RHS\end{aligned}$$

$\therefore x = 7$ is a solution

41. A Equations (249629)

- a. Given the 1st number is x , the 2nd number is $x + 1$.
∴ Equation is:
$$x + (x + 1) = 25$$
$$2x + 1 = 25$$
- b. $2x + 1 = 25$
$$2x = 24$$
$$x = 12$$
- ∴ Numbers are 12 and 13.

42. A Equations (250094)

$$c^2 = a^2 + b^2$$
$$c^2 = 12^2 + 14^2$$
$$c^2 = 144 + 196$$
$$\sqrt{c^2} = \sqrt{340}$$
$$c = 18.4390\dots$$
$$\approx 18.44$$

43. A Equations (249639)

- a. Given the 1st number is x , the 2nd number is $x + 1$.
∴ Equation is:
$$x + (x + 1) = 147$$
$$2x + 1 = 147$$
- b. $2x + 1 = 147$
$$2x = 146$$
$$x = 73$$
- ∴ Numbers are 73 and 74.

44. A Equations (248941)

When $x = 7$

$$LHS = 8x + 0.5$$
$$= 8 \times 0.3 + 0.5$$
$$= 2.4 + 0.5 = 2.9$$
$$= RHS$$

∴ $x = 0.3$ is a solution

45. A Equations (248937)

When $x = \frac{3}{4}$

$$LHS = 4x - 5$$
$$= 4 \times \frac{3}{4} - 5$$
$$= 3 - 5 = -2$$
$$= RHS$$

∴ $x = \frac{3}{4}$ is a solution

46. A Equations (248930)

When $x = 2$

$$LHS = 2x + 3$$
$$= 2 \times 2 + 3$$
$$= 7$$
$$= RHS$$

∴ $x = 2$ is a solution