

GRAYS TUITION CENTRE – Online Tutoring

WEEK: 3

Week Beginning: (04/01/2021)

Subject: MATHS

Year: 7

Lesson Objective:

- Review substituting numbers into a formula – be able to substitute negative numbers as well as positives
- Be able to solve equations
- Be able to apply skills to GCSE questions

Class Worksheets

- Pages 237 to 244 in the worksheet below
- **GCSE questions**

Homework

- Pages 244-246 in the worksheet below

Additional Notes

- All lesson worksheets and **homework for next week (due Week 4)** worksheets can be found below
- Week 2 homework will be marked in lesson

Exercise 1M

A formula is given in each of questions 1 to 10. Find the value of the letter required in each case.

1 $y = 3x + 7$
Find y when $x = 4$

3 $w = 25 - 4n$
Find w when $n = 5$

5 $c = 8(d + 3)$
Find c when $d = 6$

7 $p = 2q + 5r$
Find p when $q = 6$ and $r = 7$

9 $m = \frac{n}{4}$
Find m when $n = 48$

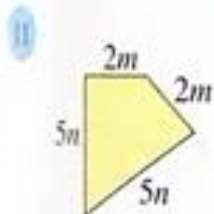
2 $m = 4n + 12$
Find m when $n = 7$

4 $a = 2(b - 6)$
Find a when $b = 10$

6 $y = x^2$
Find y when $x = 7$

8 $f = gh$
Find f when $g = 9$ and $h = 8$

10 $a = b(c - 7)$
Find a when $b = 10$ and $c = 15$



The perimeter p of this shape is given by the formula

$$p = 4m + 10n$$

Find p when $m = 8$ and $n = 13$

- 12 The average speed s of a sprinter is given by the formula

$$s = \frac{d}{t}$$

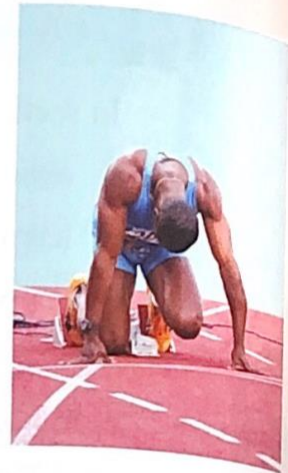
where d is the distance covered and t is the time taken.

Find the value of s when $d = 200$ and $t = 25$

- 13 The cost in pounds C for hiring a van is given by the formula $C = 3n + 65$ where n is the number of miles travelled.

Find C when $n = 60$

- 14 $V = IR$ is an electrical formula. Find the value of V when $I = 0.5$ and $R = 68$



Negative numbers can be substituted into formulas

$$m = 6 - n$$

Find m when $n = -2$.

$$m = 6 - (-2)$$

$$m = 6 + 2$$

$$m = 8$$

$$y = 3x + w$$

Find y when $x = 4$ and $w = -8$.

$$y = (3 \times 4) + (-8)$$

$$y = 12 - 8$$

$$y = 4$$

Exercise 1E

- 1 Copy and complete the following:

(a) $x = -7 - (-4)$

$$x = -7 \square 4$$

$$x = \square$$

(b) $y = -3 + (-10)$

$$y = -3 \square 10$$

$$y = \square$$

2 $a = 7 + b$

Find a when $b = -5$

3 $w = 16 - p$

Find w when $p = -3$

4 $m = 3n$

Find m when $n = -9$

5 $h = 3g - 6$

Find h when $g = -6$

6 $c = 2d + e$

Find c when $d = -4$ and $e = -7$

7 $n = 5x - y$

Find n when $x = -10$ and $y = -40$

8 $p = m^2$
Find p when $m = -6$

10 $y = 3(8 - x)$
Find y when $x = -2$

12 $a = 2b + 2c$
Find a when $b = -4$ and $c = -5$

14 $y = mx + c$
Find y when $m = 4$,
 $x = -6$ and $c = 3$

9 $a = \frac{b}{7}$
Find a when $b = -63$

11 $p = -2(8 + q)$
Find p when $q = -3$

13 $c = \frac{d}{-3}$
Find c when $d = -36$

15 $p = uw - t$
Find p when $u = 7$,
 $w = -2$ and $t = -8$

Solve the equations. The circles show what is done to both sides of the equation.

(a) $x + 4 = 16$
 $\ominus 4$ $\ominus 4$
 $x = 12$

(c) $3x = 18$
 $\div 3$ $\div 3$
 $x = 6$

(b) $x - 5 = 14$
 $\oplus 5$ $\oplus 5$
 $x = 19$

(d) $\frac{x}{2} = 6$
 $\times 2$ $\times 2$
 $x = 12$

Exercise 3M

Solve the equations below.

1 $x + 5 = 12$

4 $x - 9 = 8$

7 $5 = x + 3$

10 $3 + x = 3$

2 $x + 6 = 19$

5 $3 + x = 11$

8 $6 = x - 2$

11 $x - 14 = 10$

3 $x - 4 = 8$

6 $7 + x = 17$

9 $2 = x - 6$

12 $17 = 5 + x$

Questions 13 to 27 involve multiplication and division.

13 $7n = 21$

16 $10 = 2n$

19 $4n = 100$

22 $\frac{n}{5} = 4$

25 $\frac{n}{8} = 3$

14 $4n = 12$

17 $8 = 8n$

20 $6n = 0$

23 $70 = 7n$

26 $\frac{n}{4} = 1$

15 $5n = 45$

18 $2n = 1$

21 $\frac{n}{3} = 2$

24 $2n = 1000$

27 $10 = \frac{n}{2}$

In questions 28 to 45 find a .

28 $a - 17 = 21$

31 $5 = a + 5$

34 $a + 36 = 120$

29 $4a = 32$

32 $63 = 9a$

35 $a - \frac{1}{3} = \frac{2}{3}$

30 $9 + a = 60$

33 $15a = 45$

36 $3a = 1$

7. (a) Solve $4x + 1 = 9$

$x = \dots\dots\dots$ (2)

(b) Solve $2x - 5 = 4$

$x = \dots\dots\dots$ (2)

(c) Solve $2y - 1 = 12$

$y = \dots\dots\dots$ (2)
(6 marks)

8. (a) Solve $4x + 1 = 19$

$x = \dots\dots\dots$ (2)

(b) Solve $4x + 3 = 19$

$x = \dots\dots\dots$ (2)

(c) Solve $2q + 7 = 1$

$q = \dots\dots\dots$ (2)
(6 marks)

9. (a) Solve $x + x + x = 15$

$x = \dots\dots\dots$ (2)

(b) Solve $6x - 7 = 38$

$x = \dots\dots\dots$ (2)

(c) Solve $7x + 18 = 74$

$x = \dots\dots\dots$ (2)
(6 marks)

10. (a) Solve $2y + 3 = 8$

$y = \dots\dots\dots$ (2)

(b) Solve $5(t - 3) = 25$

$t = \dots\dots\dots$ (2)

(c) Solve $4(5y - 2) = 48$

$y = \dots\dots\dots$ (2)
(6 marks)

11. Solve $13x + 1 = 11x + 9$

$x = \dots\dots\dots$
(3 marks)

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

$t = \dots\dots\dots$
(3 marks)

13. Solve $4y + 3 = 2y + 8$

(3 marks)

14. Solve $5y + 1 = 3y + 13$

$y = \dots\dots\dots$
(3 marks)

15. Solve $3y + 10 = 5y + 3$

$y = \dots\dots\dots$
(3 marks)

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

$y = \dots\dots\dots$
(3 marks)

Homework Questions:

242

37 $65 = a - 25$

38 $140 = a - 20$

39 $4a = 412$

40 $109 = a - 206$

41 $\frac{a}{3} = 9$

42 $\frac{a}{5} = 100$

43 $0 = 15a$

44 $a + 14 = 14$

45 $\frac{a}{10} = 6$

Equations with two operations

(a) $6n - 5 = 19$

$\oplus 5$ $\oplus 5$

$6n = 24$

$\div 6$ $\div 6$

$n = 4$

Check: $6 \times 4 - 5 = 19$

(b) $3n + 4 = 31$

$\ominus 4$ $\ominus 4$

$3n = 27$

$\div 3$ $\div 3$

$n = 9$

Check: $3 \times 9 + 4 = 31$

Exercise 3E

Solve the equations below. Check by substituting the answer back in the equation.

1 $4n - 1 = 11$

2 $2n + 3 = 17$

3 $6n - 9 = 15$

4 $5n + 6 = 16$

5 $4n - 9 = 11$

6 $2n - 10 = 8$

7 $3n + 7 = 37$

8 $9n + 4 = 13$

9 $7n - 6 = 15$

10 $7n - 10 = 25$

11 $4n - 7 = 73$

12 $3n + 8 = 26$

In questions 13 to 24 solve the equations to find x .

13 $7x + 2 = 30$

14 $5x - 9 = 31$

15 $6x - 40 = 20$

16 $8x + 3 = 59$

17 $2 + 4x = 30$

18 $19 + 3x = 19$

19 $12 + 6x = 42$

20 $10x - 13 = 27$

21 $7x - 40 = 100$

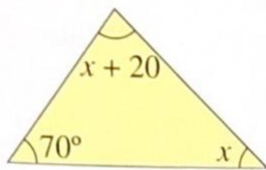
22 $2x - 38 = 62$

23 $7 + 2x = 19$

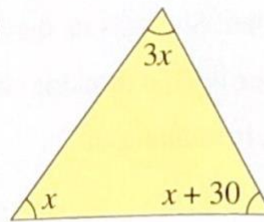
24 $2x + 6 = 7$

- 11 For each triangle, write down an equation then solve it to find x .

(a)



(b)



- 12 The angles of a triangle are A, B and C. Angle B is three times as big as angle A. Angle C is 45° bigger than angle A. Find the size of angle A. (Hint: let the size of angle A be x°)

Mixed equations

Solve the equations where the 'n' terms are on the right hand side.

(a) $7 = 5n - 8$

$$\begin{array}{cc} (+8) & (+8) \end{array}$$

$15 = 5n$

$$\begin{array}{cc} (\div 5) & (\div 5) \end{array}$$

$3 = n$

(b) $11 = 3 + 2n$

$$\begin{array}{cc} (-3) & (-3) \end{array}$$

$8 = 2n$

$$\begin{array}{cc} (\div 2) & (\div 2) \end{array}$$

$4 = n$

Exercise 4E

Solve the equations below. Check by substituting the answer back in the equation.

1 $37 = 4n + 1$

2 $7 = 2n - 5$

3 $7 = 20n - 13$

4 $33 = 2n + 9$

5 $3n + 16 = 25$

6 $55 = 15 + 8n$

7 $16 = 16 + 3n$

8 $19 = 2n - 11$

9 $59 = 4n + 3$

In questions 10 to 21 find the value of the letter in each question.

10 $6t - 9 = 45$

11 $50 = 7y + 8$

12 $11 = 3 + 8c$

13 $3x + 10 = 85$

14 $0 = 4m - 36$

15 $16 + 2p = 106$

16 $7 + 5n = 62$

17 $8w - 25 = 47$

18 $10a - 15 = 205$

19 $3y - 70 = 260$

20 $156 = 26 + 2q$

21 $540 = 3x - 63$