Planner

Using equations

- How to solve equations involving brackets
- How to form and solve simple equations

Keywords

You should know

explanation 1a | explanation 1b | explanation 1c | explanation 1d | online

1 Solve these equations.

a $2n = 6$ **b** $3p + 1 = 4$ **c** $5y - 2 = 13$

d $3x - 2 = 16$ **e** $8 = 12a - 4$ **f** $22 = 6b - 8$

g $12 + 4p = 4$ **h** $6a + 1 = -5$ **i** $5d - 4 = -19$

2 Each table gives instructions for solving an equation. Copy and complete.

a Solve $5x - 2 = 3x + 9$

Action to both sides	Effect
$-3x$	$2x - 2 = 9$
$+2$	$2x = 11$
$\div 2$	

b Solve $x - 3 = 7x - 15$

Action to both sides	Effect
$-x$	
$+15$	
$\div 6$	

c Solve $12k + 7 = 2k$

Action to both sides	Effect
$-2k$	
-7	
$\div 10$	

d Solve $\frac{p}{2} + 9 = 3p$

Action to both sides	Effect
$\times 2$	
$-p$	
$\div 5$	

3 Solve these equations using a method similar to question **2**.

a $8x - 19 = 5x + 2$ **b** $6a - 7 = 2a + 13$ **c** $3x - 4 = 10x - 25$

d $7x - 2 = 10x - 5$ **e** $2 + 8x = 5x + 8$ **f** $7k - 3 = 5k - 6$

4

a Follow Jane's advice and solve $24 = 9 - 3m$.

b Explain how to solve $30 - 10p = 9$.

5 Solve these equations.

a $x = 12 - 3x$ **b** $5 - 2n = n + 17$ **c** $12 - m = 17 - 11m$

explanation 2a | explanation 2b | explanation 2c | online

6 Solve these equations.

a $2(x + 1) = 6$ **b** $5(m - 2) = 15$ **c** $5 = 2(a - 1)$

d $4(p - 6) = 0$ **e** $3(y + 6) - 24 = 0$ **f** $2(z + 1) + 3 = 5$

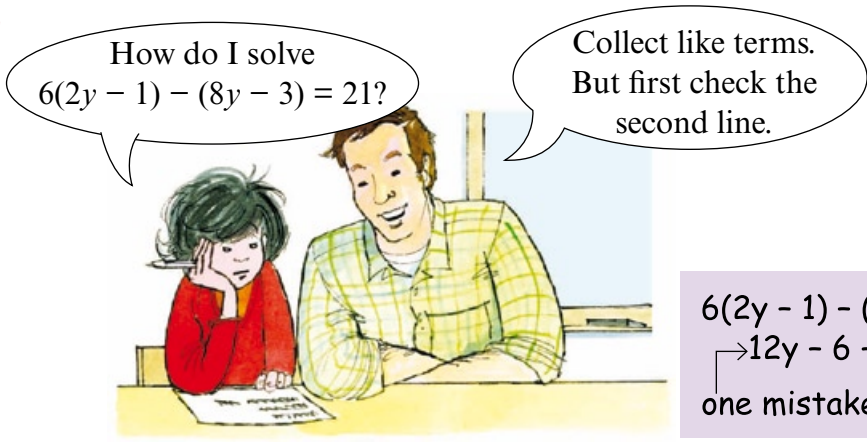
g $\frac{x + 1}{2} = 3$ **h** $\frac{8}{b} = 4$ **i** $5 + \frac{8}{c} = 21$

j $4 - \frac{9}{k} = 7$ **k** $\frac{3}{p} + 4 = 0$ **l** $\frac{25}{g} = g$

7 Copy and complete the table to solve the equation $-3 = \frac{1 + q}{1 - q}$.

Action to both sides	Effect
Multiply by $(1 - q)$	
Subtract q	
Add 3	
Divide by 2	

8



6(2y - 1) - (8y - 3) = 21
→12y - 6 - 8y - 3 = 21
one mistake

a What error has Ellie made in her second line? Complete the solution for her.

b Solve $3(4n - 1) - 2(2n - 7) = 51$.

9 Solve each equation. Use a method similar to questions **8**.

a $5(x - 4) + 3(x + 12) = 0$

b $8 + 4(2x + 5) = x$

c $3(x + 2) - (x - 1) = 8$

d $7(x - 1) - 2(x - 3) = 14$

e $3(2x - 3) + 2(1 - 2x) = 6$

f $9x + 14 = 2(3x + 8)$

g $5(1 - 3x) = 4(2 - 3x)$

h $5(x - 1) = 3(x + 5)$

explanation 3a explanation 3b

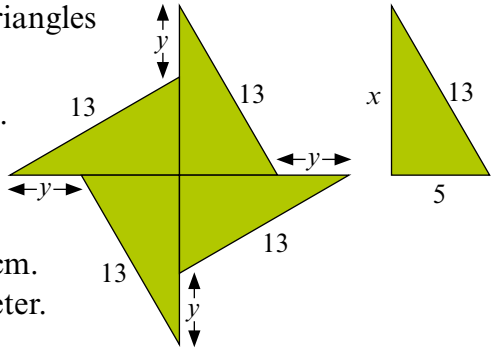
10 Brian, Keith and Nadeem each write an expression on a piece of card.

2(3x + 5)	10(x + 2)	2x - 39
Brian	Keith	Nadeem

a What value of x makes the value of Brian's card equal to Keith's card?

b Find the value of x that makes the sum of all these cards equal to zero.

11 A logo is made by placing four identical triangles together.

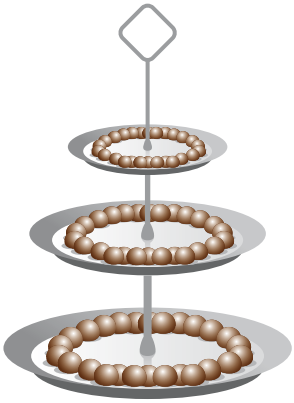


a Write an expression for y in terms of x.

b Write an expression for the perimeter of the logo. Simplify it.

c The actual perimeter of the logo is 80 cm. Write down an equation for the perimeter. Solve it to find x.

12 Handmade chocolates are arranged on a three-tier tray. The top tray contains 10 fewer chocolates than the middle tray. The bottom tray contains 3 times as many as the top tray.



Let x be the number of chocolates on the middle tray.

a Write the number of chocolates on the top tray in terms of x.

b How many chocolates are on the bottom tray? Give your answer in terms of x.

c There are 70 chocolates altogether. Write an equation and solve it to find x.

d How many chocolates are there on each tray?

13 At the start of a game, Peter and Sheila had 70 marbles altogether. They played a game and Peter lost 10 marbles to Sheila.

Let m be the number of marbles Peter had at the start.

a Copy and complete the table.

	Peter	Sheila
Number of marbles at the start of the game	m	
Number of marbles at the end of the game		

b At the end of the game, Sheila had four times as many marbles as Peter. Write an equation, in terms of m, to show this. Solve it to find the value of m.

c How many marbles did Peter have at the end of the game?

14 Mrs Logan wrote a negative number on the board. She called the number n.

a Sarah added 3 to the number, and then multiplied her answer by 8.
Write an expression for her result.

b David multiplied the original number by 6, and then added 2.
Write an expression for his result.

c Sarah and David got the same final answer. Use your answers to parts **a** and **b** to write an equation. Solve it to find the value of n.

15 David and Julie had 60 minutes of call time altogether.
They each phoned a friend. David used 1 minute and Julie used 4 minutes.
David then had four times as much call time as Julie had.

Let t be the number of minutes David had before he phoned his friend.

a Copy and complete the table.

	David	Julie
Number of minutes before call	t	
Number of minutes remaining after call		

b Write an equation and solve it to find t.

16 A barrel contained 11 litres of water. Another barrel contained 3 litres of water. Linda added x litres of water to both barrels. The first barrel then had three times as much water as the second barrel had.

a Draw and complete a table, like that in question **15**.

b Write an equation in terms of x.

c Solve your equation to find the value of x.
How much water was in each barrel after Linda added the extra water?

17 At the start of their holiday, Christine and Gavin had \$120 altogether.
At the airport, their aunt gave them another \$21 each.
Gavin then had twice as much as Christine.

Let x represent the amount Christine had before her aunt gave her \$21.

a Copy and complete the table.

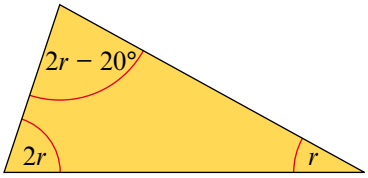
	Christine	Gavin
At the start of the holiday	x	
At the airport		

b Write an equation and solve it to find x.

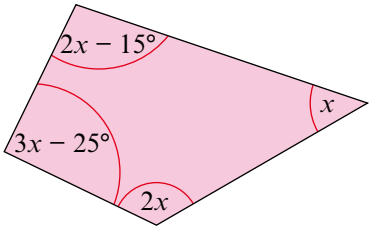
c How much money did Gavin have at the airport?

18 Write an equation for each shape and solve it.

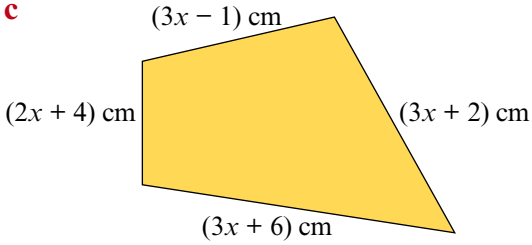
a



b

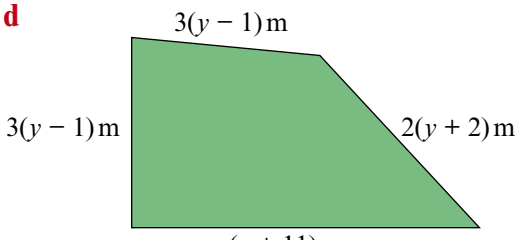


c



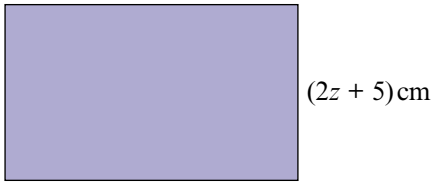
Perimeter = 55 cm

d



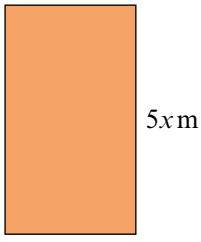
Perimeter = 36 m

e



Area = 104 cm^2

f



Area = 1960 m^2