



Using equations

- Forming and solving simple equations

Keywords

You should know

explanation 1a

explanation 1b

explanation 1c

- 1** Solve these equations.

a $x + 2 = 6$

b $t - 3 = 7$

c $3 + m = 2$

d $3x - 2 = 16$

e $8 = 12a - 4$

f $22 = 6b - 8$

g $12 + 4p = 4$

h $6a + 1 = -5$

i $5d - 4 = -19$

explanation 2a

explanation 2b

explanation 2c

- 2** Solve these equations.

a $12x = 2x + 10$

b $7x - 8 = 3x$

c $6a + 3 = 2a + 7$

d $9p - 4 = 10p - 5$

e $4q + 6 = 3q + 2$

f $6 - n = n - 4$

g $3 - 4n = 2n - 15$

h $7n - 20 = -3n$

i $4f + 3 = 8 - f$

j $2 + 7t = t + 11$

k $-r - 5 = 4 + 2r$

l $4 - 7s = 3s + 4$

- 3** 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 $\frac{25}{g} = g$

- 4** Solve these equations.

Expand brackets first, then eliminate the letter from one side of the equation.

a $2(2x + 3) = 3(x + 1)$

b $6(3g + 2) = 4(4g + 7)$

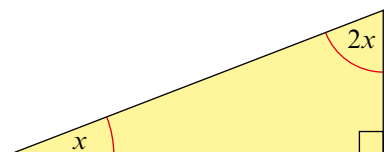
c $3(m + 1) + 2(2m + 9) = 0$

d $2(3f + 5) - 12 = 16$

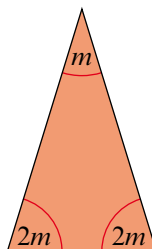
explanation 3

5 What is the size of each angle in these triangles? Write equations and solve them.

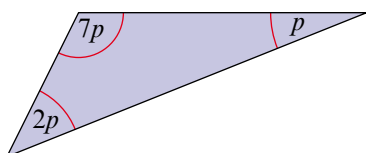
a



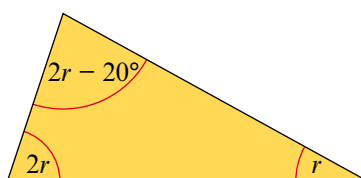
b



c

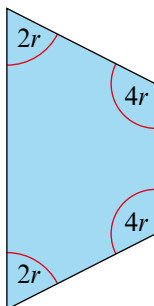


d

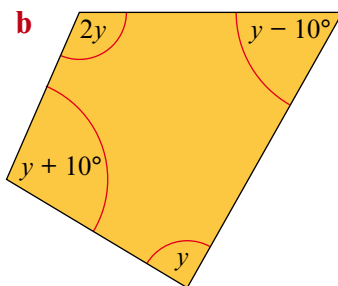


6 What is the size of each angle in these quadrilaterals? Write equations and solve them.

a



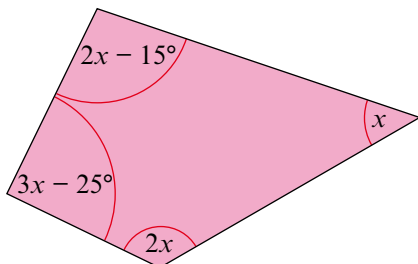
b



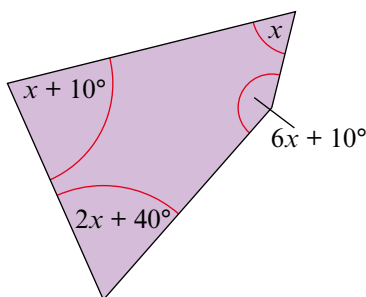
Remember

The sum of angles in a quadrilateral is 360° .

c

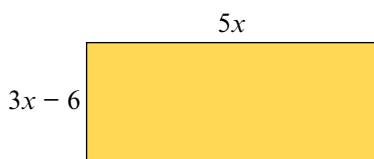


d

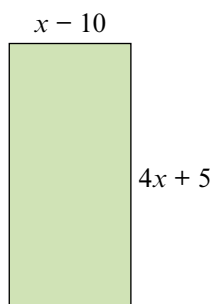


7 Write an equation for the perimeter of each rectangle. Use your equations to help you to work out the width and length of each rectangle.

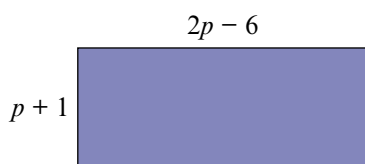
a Perimeter = 36 cm



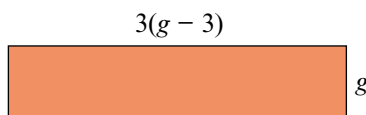
b Perimeter = 110 cm



c Perimeter = 50 cm

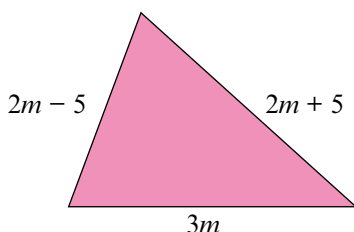


d Perimeter = 46 cm

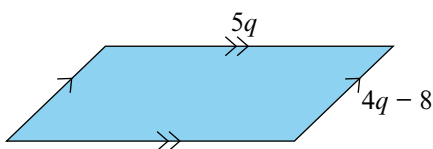


8 Write an equation for the perimeter of each shape. Use your equations to help you to work out the length of each side.

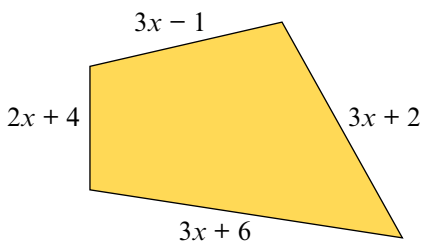
a Perimeter = 56 cm



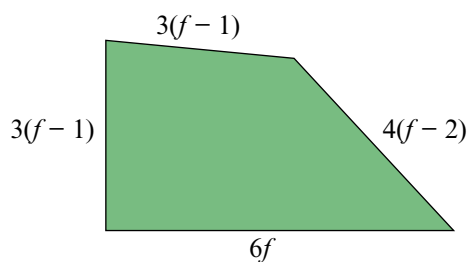
b Perimeter = 74 cm



c Perimeter = 36 cm



d Perimeter = 40 cm



explanation 4a

explanation 4b

- 9** What is the value of each letter? Write and solve equations to help you.
- a** When x is doubled and 4 added, the result is 12.
 - b** When y is trebled and 6 subtracted, the result is 6.
 - c** When p is multiplied by 4 and 3 added, the result is 27.
 - d** When 2 is added to k and the answer multiplied by 5, the result is 25.
 - e** When 4 is added to m and the answer multiplied by 6, the result is 24.
 - f** When 3 is subtracted from twice q and the answer multiplied by 3, the result is 27.

- 10** Paula is y years old.
 Paula's brother is 7 years older than Paula.
 Paula's sister is 2 years younger than Paula.
- a** Write an expression in terms of y for the sum of the ages of the three children.
 - b** The sum of the ages of the three children is 20.
 Use your answer to part **a** to write an equation involving y .
 - c** How old is Paula?
 - d** How old are Paula's brother and sister?



- 11** On Tuesday, Kate spent x minutes on her homework.
 Ibrahim spent 20 minutes more than Kate.
 Miguel spent 20 minutes more than Ibrahim.
- a** Write an expression in terms of x for the total time Kate, Ibrahim and Miguel spent on their homework.
 - b** Kate, Ibrahim and Miguel spent a total of 120 minutes on their homework.
 Use your answer to part **a** to write an equation involving x .
 - c** How long did Kate spend on her homework?
 - d** How long did Ibrahim and Miguel spend on their homework?

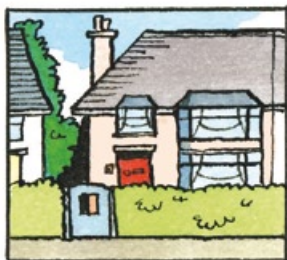
12 Three houses are for sale.

Acacia House is on sale for $\text{£}x$.

Beech Hall is on sale for twice as much as Acacia House.

Chestnut Cottage is on sale for $\text{£}100\,000$ more than Acacia House.

The total sale price of the three houses is $\text{£}600\,000$.



Acacia House



Beech Hall

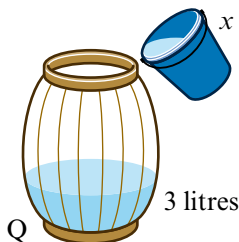
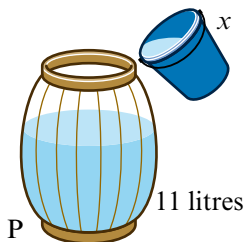


Chestnut Cottage

- a** Write an equation in terms of x for the total sale price of the three houses.
- b** What is the sale price of Acacia House?
- c** What is the sale price of Beech Hall and Chestnut Cottage?

13 Two barrels P and Q contain 11 litres and 3 litres of water respectively.

x litres of water is added to both barrels.



- a** Write expressions in terms of x for the amount of water in each barrel after the extra water is added.
- Barrel P now has three times the amount of water as barrel Q.
- b** Write an equation in terms of x in order to show the relationship between the amounts of water in the barrels.
 - c** What is the amount of water added to each barrel?
 - d** What is the amount of water in both barrels after the water is added?