Solutions by
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GCSE (9-1) Grade 4 Forming and Solving Equations

Instructions

Use **black** ink or ball-point pen.
Fill in the boxes at the top of this page with your name.
Answer **all** questions.
Answer the questions in the spaces provided
– there may be more space than you need.
Show all your working out

Information

The marks for **each** question are shown in brackets.
Use this as a guide as to how much time to spend on each question.
Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed

Advice

Read each question carefully before you start to answer it
Attempt every question
Check your answers if you have time at the end

1.

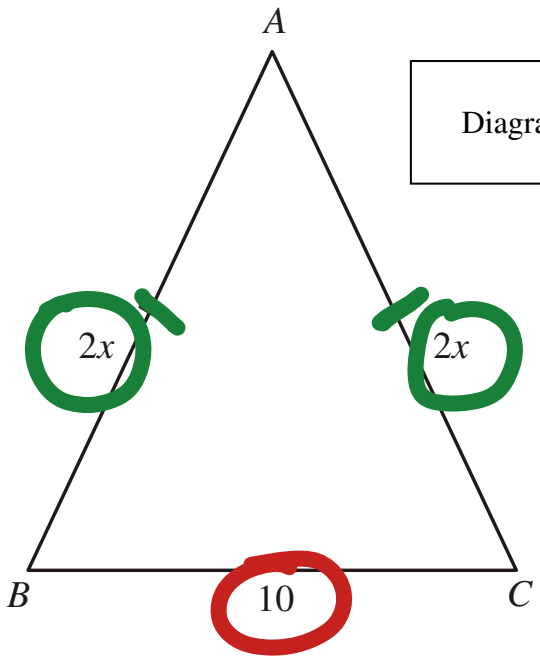


Diagram **NOT** accurately drawn

In the diagram, all measurements are in centimetres.

ABC is an isosceles triangle.
$AB = 2x$
$AC = 2x$
$BC = 10$

(a) Find an expression, in terms of x, for the **perimeter** of the triangle.
Simplify your expression.

$2x + 2x + 10 = 4x + 10$

.....

(2)

The perimeter of the triangle is 34 cm.

(b) Find the value of x.

$4x + 10 = 34$

$4x = 24$

$x = \frac{24}{4}$

$x = 6$

.....

(2)

(4 marks)

2.

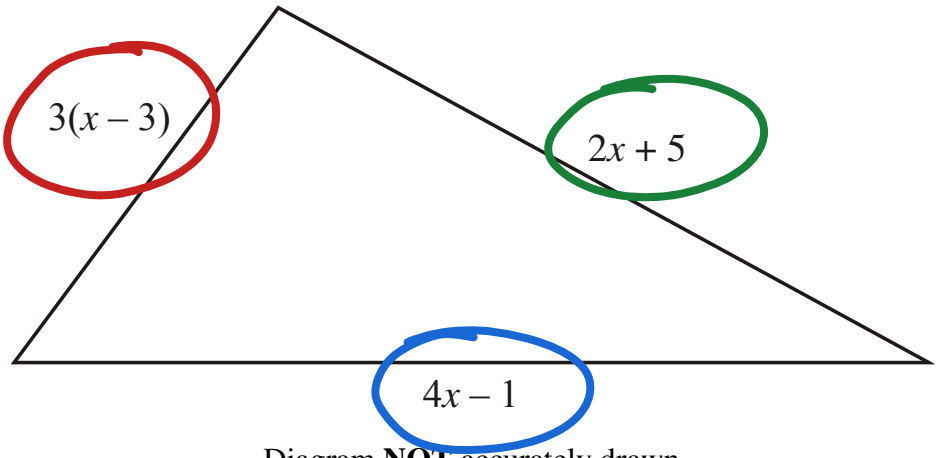


Diagram **NOT** accurately drawn

The lengths, in cm, of the sides of the triangle are $3(x - 3)$, $4x - 1$ and $2x + 5$

(a) Write down, in terms of x, an expression for the perimeter of the triangle.

$3x - 9 + 2x + 5 + 4x - 1 = 9x - 5$

$9x - 5$ ..... cm

(2)

The perimeter of the triangle is 49 cm.

(b) Work out the value of x.

$9x - 5 = 49$

$9x = 54$

$x = \frac{54}{9} = 6$

$x =$ .....

(2)

(4 marks)

3.

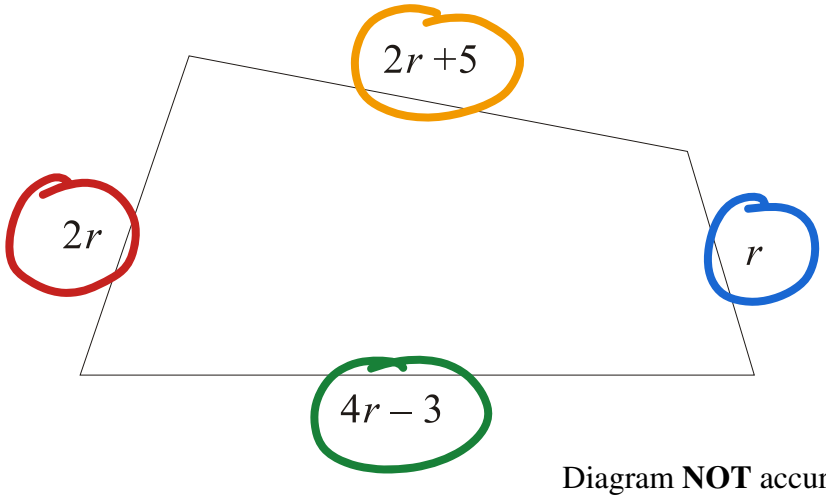


Diagram **NOT** accurately drawn

In the diagram, all measurements are in centimetres.

The lengths of the sides of the quadrilateral are

$2r + 5$
$2r$
$4r - 3$
r

(a) Find an expression, in terms of r, for the perimeter of the quadrilateral.
Give your expression in its simplest form.

$9r - 8$

.....

(2)

The perimeter of the quadrilateral is 65 cm.

(b) Work out the value of r.

$9r - 8 = 65$

$9r = 73$

$r = \frac{73}{9}$

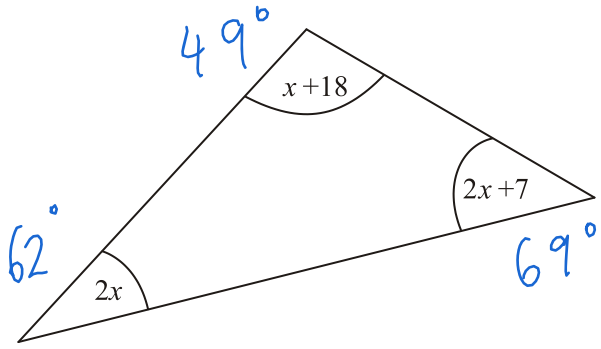
$r = 8.1$

.....

(2)

(4 marks)

4.



Sum to 180°

Diagram **NOT** accurately drawn

The sizes of the angles, in degrees, of the triangle are

$2x + 7$
$2x$
$x + 18$

(a) Use this information to write down an equation in terms of x.

$5x + 25 = 180$

(2)

(b) Use your answer to part (a) to work out the value of x.

$5x + 25 = 180$

$5x = 155$

$x = \frac{155}{5} = 31°$

$x =$ .....

(2)

(4 marks)

5.

Sum to 360°

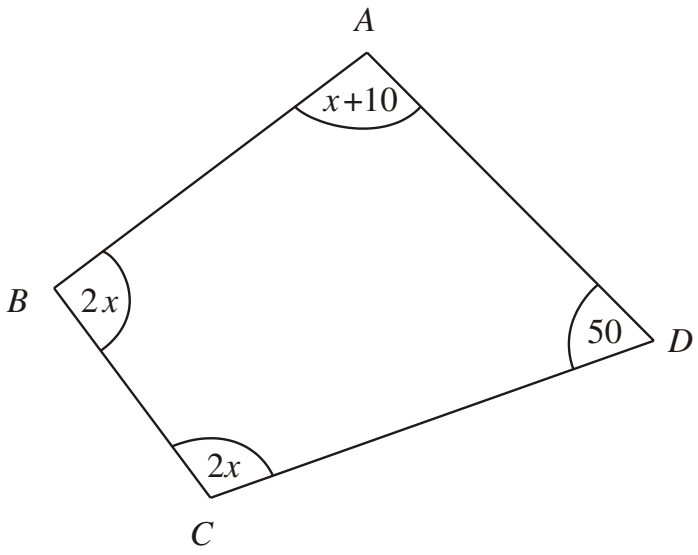


Diagram **NOT** accurately drawn

In this quadrilateral, the sizes of the angles, in degrees, are

$x + 10$
$2x$
$2x$
50

(a) Use this information to write down an equation in terms of x.

$5x + 60 = 360$

(2)

(b) Work out the value of x.

$5x + 60 = 360$

$5x = 300$

$x = \frac{300}{5}$

$x = 60^\circ$

(3)

(5 marks)

6.

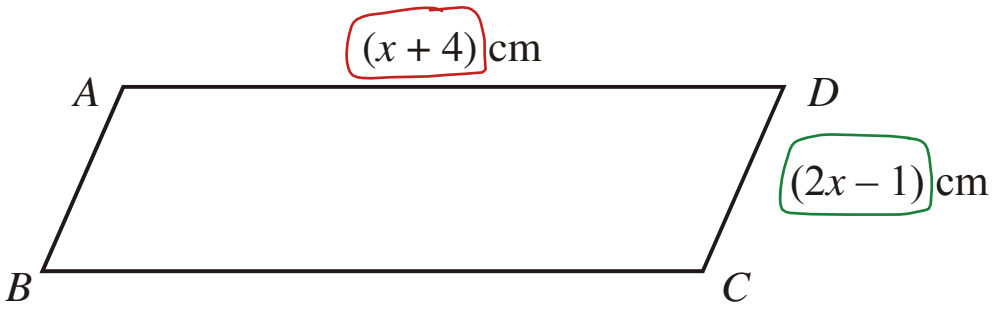


Diagram **NOT** accurately drawn

ABCD is a parallelogram.
AD = (*x* + 4) cm,
CD = (2*x* – 1) cm.
The perimeter of the parallelogram is 24 cm.

(i) Use this information to write down an equation, in terms of *x*.

$6x+6=24$

$x+4+2x-1=12$

$3x+3=12$

.....

(ii) Solve your equation.

$3x+3=12$

$3x=9$

$x=3$

$6x+6=24$

$6x=18$

$x=3$

x = ...

(4 marks)

7. The perimeter of this triangle is 19 cm.
All lengths on the diagram are in centimetres.

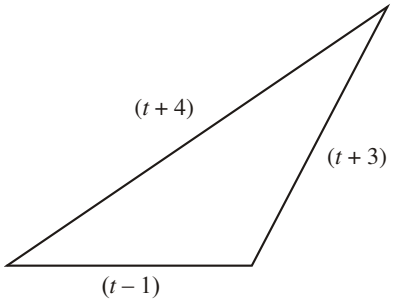


Diagram **NOT** accurately drawn

Work out the value of t.

$3t + 6 = 19$

$3t = 16$

$t = \frac{16}{3} = 5\frac{1}{3}$

$t =$ 5.3

(3 marks)

8.

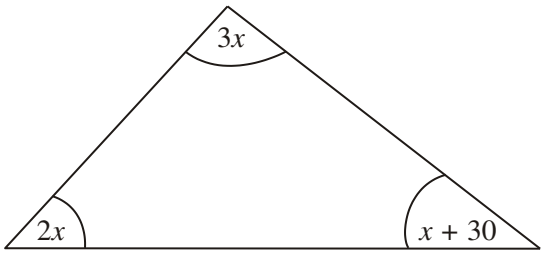


Diagram **NOT** accurately drawn

The diagram shows a triangle.
The sizes of the angles, in degrees, are

$3x$
$2x$
$x + 30$

Work out the value of x.

$6x + 30 = 180$

$6x = 150$

$x = 25$

$x =$ 25°

(3 marks)

9.

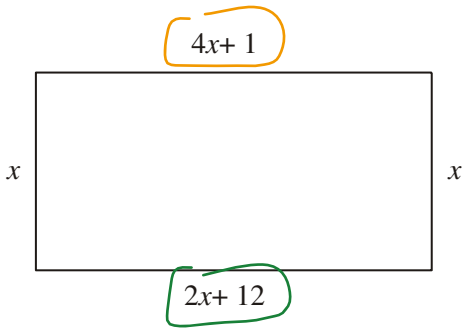


Diagram **NOT** accurately drawn

The diagram shows a rectangle.
All the measurements are in centimetres.

(a) Explain why $4x + 1 = 2x + 12$

Opposite sides of a rectangle are equal in length.

(1)

(b) Solve $4x + 1 = 2x + 12$

$4x + 1 = 2x + 12$

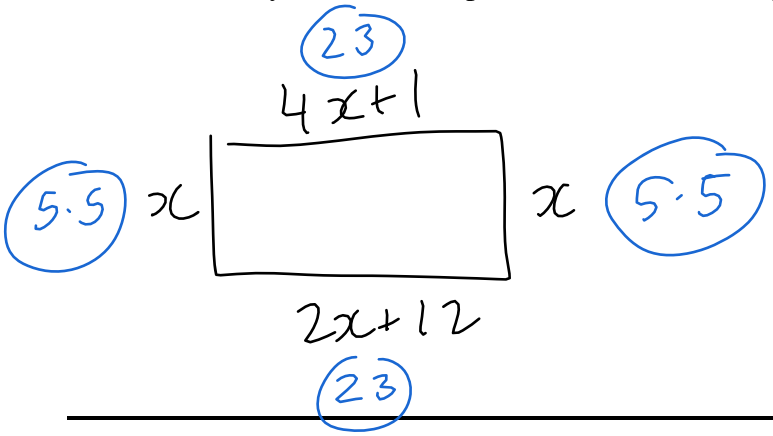
$2x + 1 = 12$

$2x = 11$

$x = 5.5$

(2)

(c) Use your answer to part (b) to work out the perimeter of the rectangle.



$23 + 23 + 11$

57 cm

(2)

(5 marks)