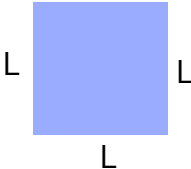
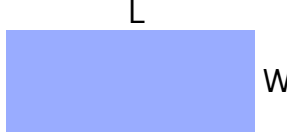
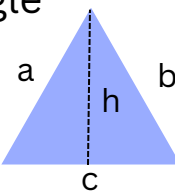
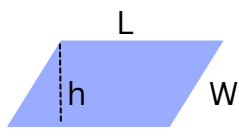
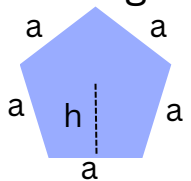


GCSE & High School Topic Questions

Area & Perimeter

The **perimeter** of a shape is the sum of each sides length.

The **area** of a shape is the space inside the boundary of a closed shape.

SHAPE	PERIMETER	AREA
Square 	$P = 4 \times L$	$A = L \times L$
Rectangle 	$P = 2 \times (L + W)$	$A = L \times W$
Triangle 	$P = a + b + c$	$A = \frac{1}{2}(c \times h)$ c is the base
Parallelogram 	$P = 2 \times (L + W)$	$A = (b \times h)$ b is the length
Regular n-agon 	$P = 5 \times a$ When all sides are equal	$A = \frac{1}{2}(h \times n \times a)$ n=number of sides

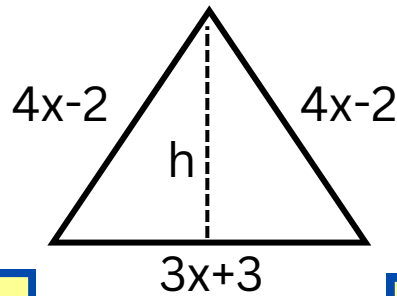
GCSE & High School Topic Questions

Area & Perimeter

Example 1

Find expressions for the perimeter and area of each shape. use $h=8\text{cm}$

(a)



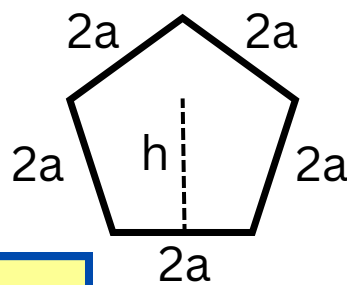
add sides length

Apply formula

$$\begin{aligned}\text{Perimeter} &= a + b + c \\ &= (4x-2) + (4x-2) + (3x+3) \\ &= 4x+4x+3x-2-2+3 \\ &= 11x-1\end{aligned}$$

$$\begin{aligned}\text{Area} &= \frac{1}{2}(b \times h) \\ &= \frac{1}{2}(3x+3)(8) \\ &= 4(3x+3) \\ &= 12x+12\end{aligned}$$

(b)



multiply sides length by 5

Apply formula

$$\begin{aligned}\text{Perimeter} &= 5(2a) \\ &= 10a\end{aligned}$$

$$\begin{aligned}\text{Area} &= \frac{1}{2}(h \times n \times a) \\ &= \frac{1}{2}(8 \times 5 \times 2a) \\ &= \frac{1}{2}(80a) \\ &= 40a\end{aligned}$$

GCSE & High School Topic Questions

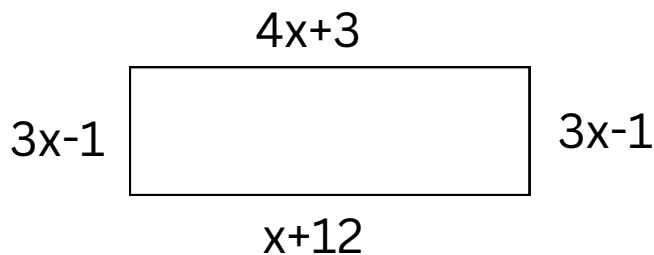
Area & Perimeter

Example 2

The diagram shows a rectangle.

(a) find x

(b) find perimeter of the rectangle



(a) first we find x ,

$$4x + 3 = x + 12$$

$$4x - x = 12 - 3$$

$$3x = 9$$

$$x = 3$$

The horizontal sides have equal length, so we can form an equation with them

substitute x to
find sides length

$$\begin{aligned} \text{(b) Longer side} &= 4x + 3 \\ &= 4(3) + 3 \\ &= 15 \end{aligned}$$

$$\begin{aligned} \text{Shorter side} &= 3x - 1 \\ &= 3(3) - 1 \\ &= 8 \end{aligned}$$

$$\begin{aligned} \text{Perimeter} &= 15 + 15 + 8 + 8 \\ &= 46 \end{aligned}$$

$$\begin{aligned} \text{Longer side} &= x + 12 \\ &= 3 + 12 \\ &= 15 \end{aligned}$$

add sides length

GCSE & High School Topic Questions

Area & Perimeter

Sum of interior angles

The sum of the interior angles of a given polygon = $(n - 2) \times 180^\circ$,
where n = the number of sides of the polygon.

Number of Sides	Name of Shape	Minimum Number of triangles	Interior Angle Sum
3	Triangle	1	180°
4	Quadrilateral	2	360°
5	Pentagon	3	540°
6	Hexagon	4	720°
7	Heptagon	5	900°
8	Octagon	6	1080°

Examples:

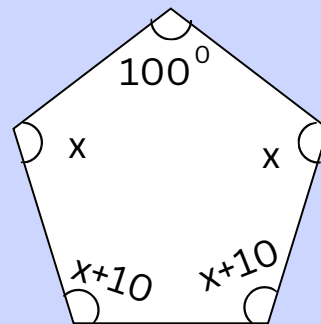
Calculate the value of x .

$$100 + x + x + x + 10 + x + 10 = 540$$

$$4x + 120 = 540$$

$$4x = 540 - 120$$

$$x = 105$$



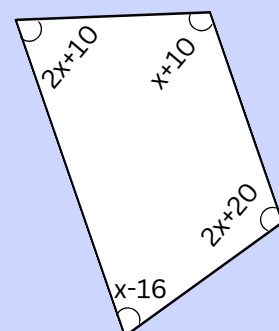
Calculate the value of x .

$$2x + 10 + x + 10 + 2x + 20 + x - 16 = 360$$

$$6x + 24 = 360$$

$$6x = 360 - 24$$

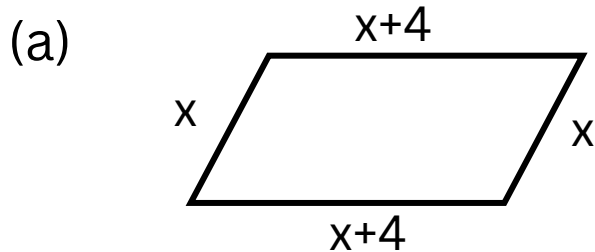
$$x = 56$$



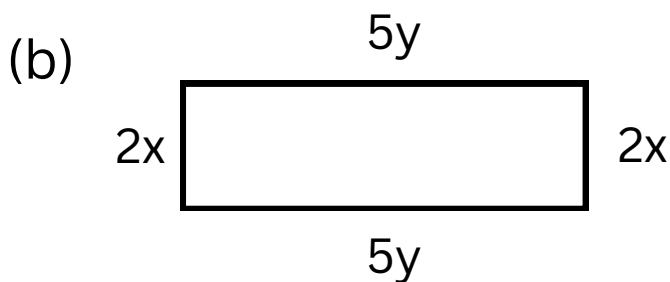
GCSE & High School Topic Questions

Area & Perimeter

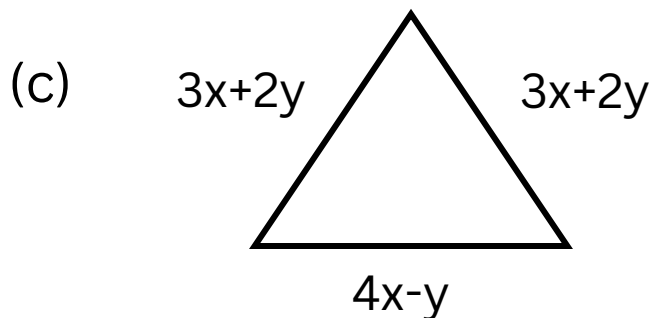
Q1 Find expressions for the perimeter and area of each shape. For area, use $h=6\text{cm}$



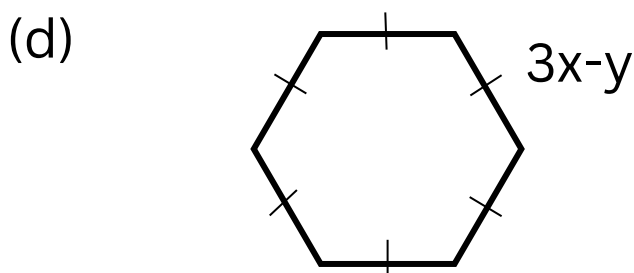
(2 marks)



(2 marks)



(2 marks)

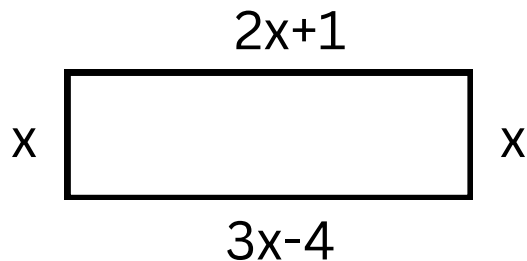


(2 marks)

GCSE & High School Topic Questions

Area & Perimeter

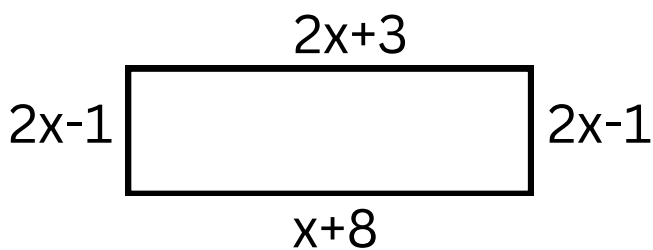
Q2 The diagram shows a rectangle.



- (a) Workout the value of x .
- (b) Workout the perimeter of the rectangle.

(2 marks)

Q3 The diagram shows a rectangle.



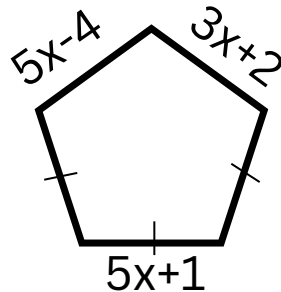
- (a) Workout the value of x .
- (b) Workout the perimeter of the rectangle.

(2 marks)

GCSE & High School Topic Questions

Area & Perimeter

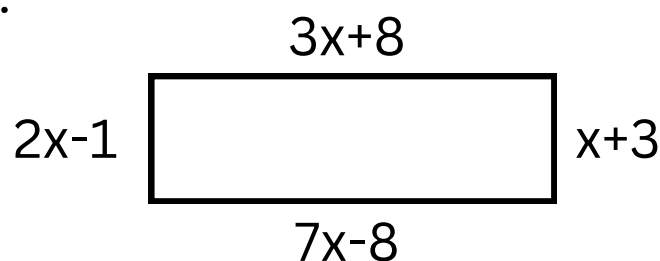
Q4 The diagram shows a pentagon.



- Workout the value of x .
- Workout the perimeter of the pentagon.

(2 marks)

Q5 Find the perimeter of the rectangle below.
The expression for the length & widths are in centimeter.

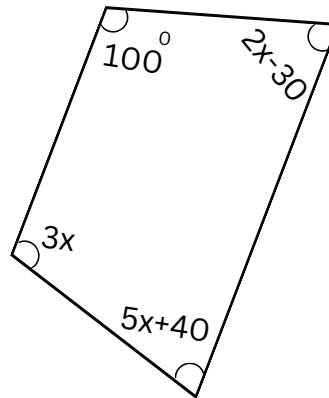


(2 marks)

GCSE & High School Topic Questions

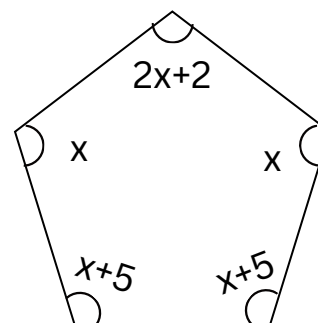
Area & Perimeter

Q6 Calculate the value of x in the given diagram.



(2 marks)

Q7 Calculate the value of x in the given diagram.

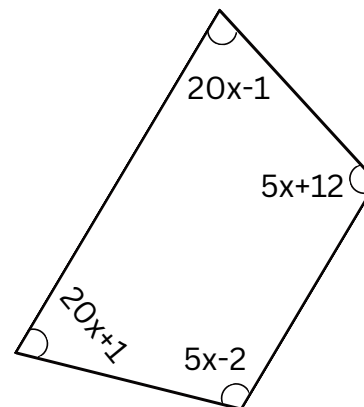


(2 marks)

GCSE & High School Topic Questions

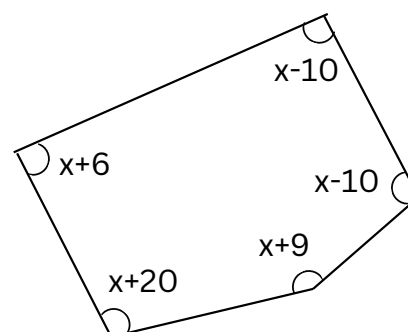
Area & Perimeter

Q8 Calculate the value of x in the given diagram.



(2 marks)

Q9 Calculate the value of x in the given diagram.

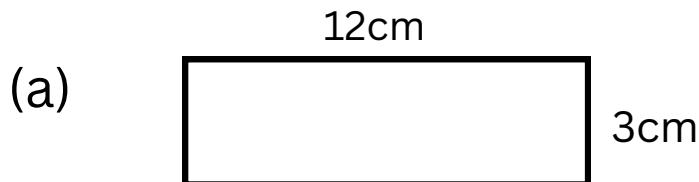


(2 marks)

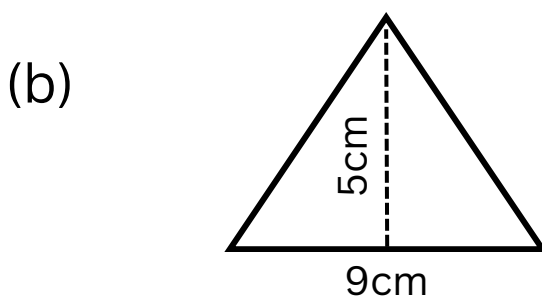
GCSE & High School Topic Questions

Area & Perimeter

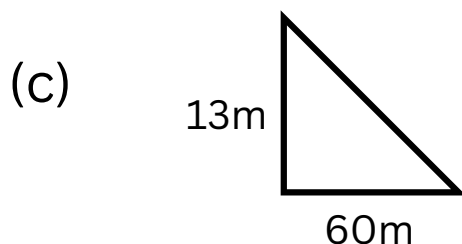
Q10 Work out the area of the each shape.



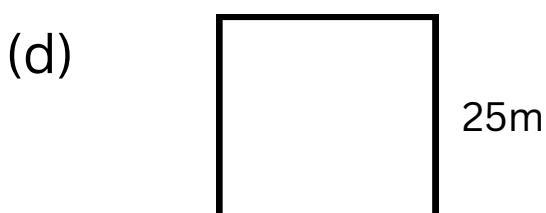
(2 marks)



(2 marks)



(2 marks)



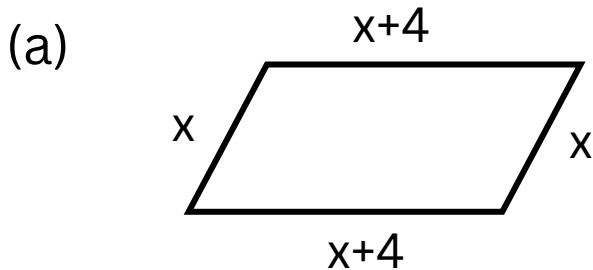
(2 marks)

GCSE & High School Topic Questions

Area & Perimeter

answers

Q1 Find expressions for the perimeter and area of each shape. For area, use $h=6\text{cm}$



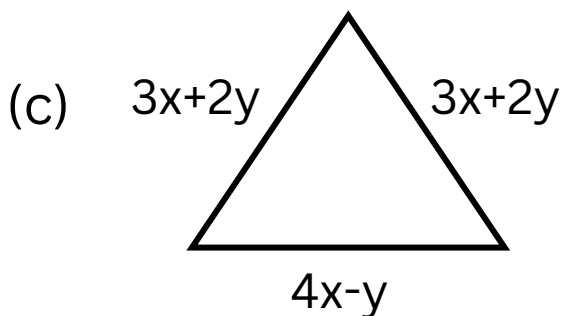
$$\begin{aligned}\text{Perimeter} &= x+4+x+4+x+x \\ &= 4x+8\end{aligned}$$

$$\begin{aligned}\text{Area} &= (x+4)x \\ &= x^2+4x\end{aligned}$$



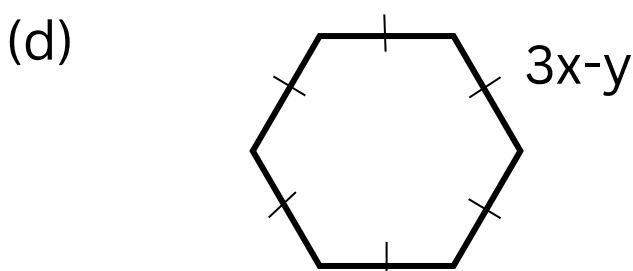
$$\begin{aligned}\text{Perimeter} &= 5y+5y+2x+2x \\ &= 4x+10y\end{aligned}$$

$$\begin{aligned}\text{Area} &= (5y) \times (2x) \\ &= 10xy\end{aligned}$$



$$\begin{aligned}\text{Perimeter} &= 3x+2y+3x+2y+4x-y \\ &= 10x+3y\end{aligned}$$

$$\text{Area} = 12x - 3y$$



$$\begin{aligned}\text{Perimeter} &= 6(3x-y) \\ &= 18x - 6y\end{aligned}$$

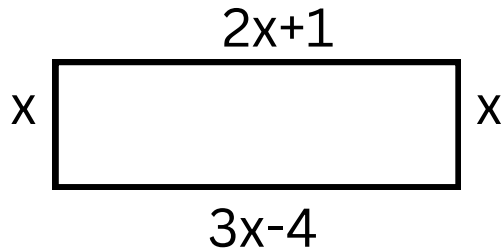
$$\text{Area} = 54x - 18y$$

GCSE & High School Topic Questions

Area & Perimeter

answers

Q2 The diagram shows a rectangle.



- (a) Workout the value of x .
- (b) Workout the perimeter of the rectangle.

Solution:

(a) first we find x ,

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

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

$$x = \mathbf{5}$$

$$\begin{aligned} \text{(b) Longer side} &= 2x + 1 \\ &= 2(5) + 1 \\ &= 10 + 1 \\ &= \mathbf{11} \end{aligned}$$

$$\begin{aligned} \text{Longer side} &= 3x - 4 \\ &= 3(5) - 4 \\ &= 15 - 4 \\ &= \mathbf{11} \end{aligned}$$

$$\text{Shorter side} = x = \mathbf{5}$$

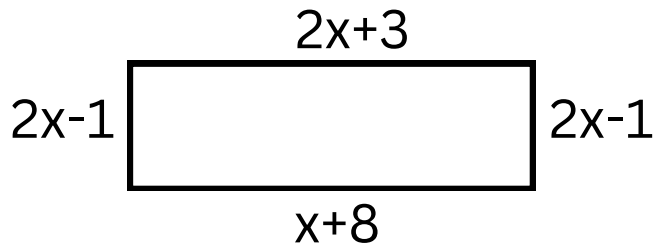
$$\begin{aligned} \text{Perimeter} &= 11 + 11 + 5 + 5 \\ &= \mathbf{32} \end{aligned}$$

GCSE & High School Topic Questions

Area & Perimeter

answers

Q3 The diagram shows a rectangle;



- (a) Workout the value of x .
(b) Workout the perimeter of the rectangle.

Solution:

(a) first we find x ,

$$2x+3 = x+8$$

$$2x-x = 8-3$$

$$x = 5$$

(b) Longer side $= 2x+3$

$$= 2(5) + 3$$

$$= 10 + 3$$

$$= 13$$

Longer side $= x+8$

$$= 5 + 8$$

$$= 13$$

Shorter side $= 2x-1$

$$= 2(5) - 1$$

$$= 10 - 1$$

$$= 9$$

Perimeter $= 13 + 13 + 9 + 9$

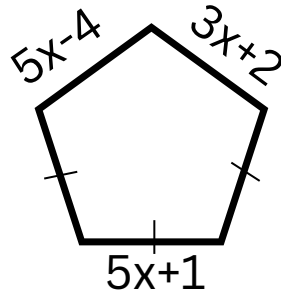
$$= 44$$

GCSE & High School Topic Questions

Area & Perimeter

answers

Q4 The diagram shows a pentagon;



- (a) Workout the value of x .
(b) Workout the perimeter of the pentagon.

Solution:

(a) first we find x ,

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

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

$$2x = 6$$

$$x=3$$

(b) shorter side = $5x-4$
 $= 5(3) - 4$
 $= 15-4$
 $= 11$

shorter side = $3x+2$
 $= 3(3) + 2$
 $= 9 + 2$
 $= 11$

longer side = $5x+1$
 $= 5(3)+1$
 $= 15+1$
 $= 16$

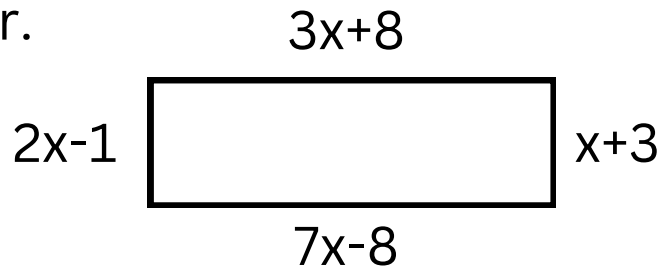
Perimeter = $16 + 16 + 16 + 11 + 11$
 $= 70$

GCSE & High School Topic Questions

Area & Perimeter

answers

- Q5 Find the perimeter of the rectangle below.
The expression for the length & widths are in centimeter.



Solution:

(a) first we find x ,

$$2x-1 = x+3$$

$$2x-x = 3+1$$

$$x=4\text{cm}$$

(b) Longer side = $3x+8$

$$= 3(4) + 8$$

$$= 12+8$$

$$= 20\text{cm}$$

Shorter side = $2x-1$

$$= 2(4)-1$$

$$= 8-1$$

$$= 7\text{cm}$$

Longer side = $7x-8$

$$= 7(4)-8$$

$$= 28-8$$

$$= 20\text{cm}$$

Shorter side = $x+3$

$$= 4+3$$

$$= 7\text{cm}$$

Perimeter = $20+ 20+ 7+ 7$

$$= 54\text{cm}$$

GCSE & High School Topic Questions

Area & Perimeter

answers

Q6 Calculate the value of x in the given diagram.

Solution:

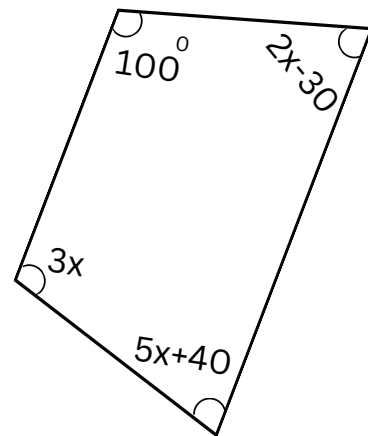
$$100 + 3x + 2x - 30 + 5x + 40 = 360$$

$$10x + 140 - 30 = 360$$

$$10x = 360 - 110$$

$$10x = 250$$

$$x = 25$$



Q7 Calculate the value of x in the given diagram.

Solution:

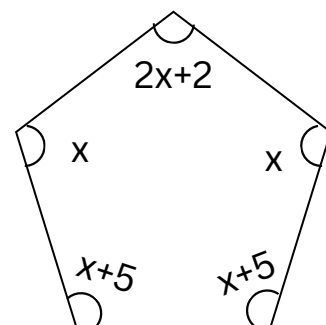
$$2x+2+x+5+x+5+x+x = 540$$

$$6x + 12 = 540$$

$$6x = 540 - 12$$

$$6x = 528$$

$$x = 88$$



GCSE & High School Topic Questions

Area & Perimeter

answers

Q8 Calculate the value of x in the given diagram.

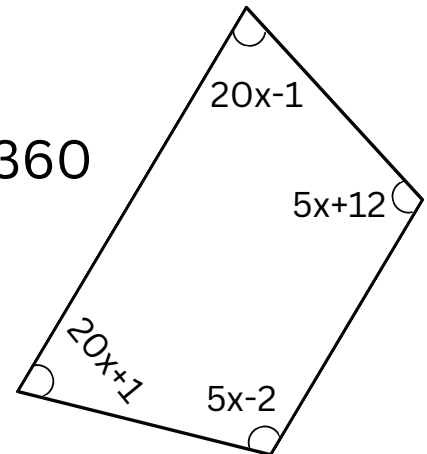
Solution:

$$(20x-1)+(20x+1)+(5x+12)+(5x-2)=360$$

$$50x+10=360$$

$$50x=350$$

$$x=7$$



Q9 Calculate the value of x in the given diagram.

Solution:

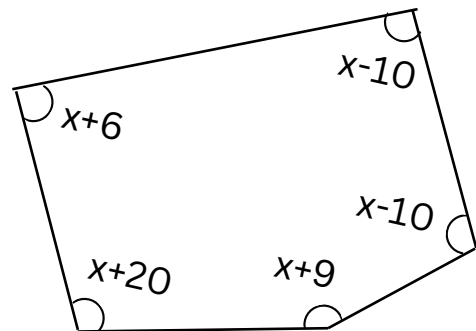
$$(x+20)+(x-10)+(x-10)+(x+9)+(x+6)=540$$

$$5x + 35 - 20 = 540$$

$$5x=540-15$$

$$5x=525$$

$$x=105$$

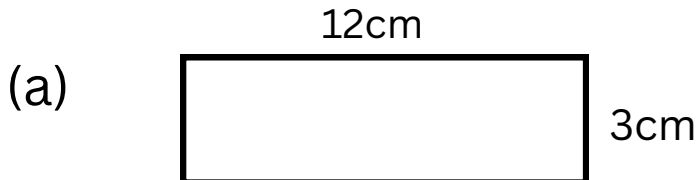


GCSE & High School Topic Questions

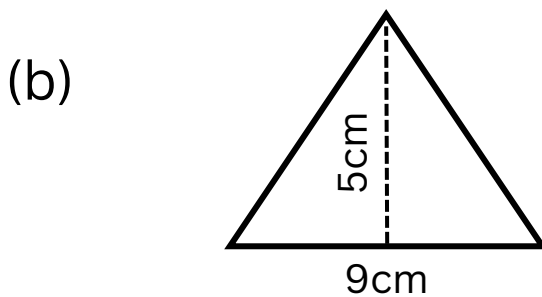
Area & Perimeter

answers

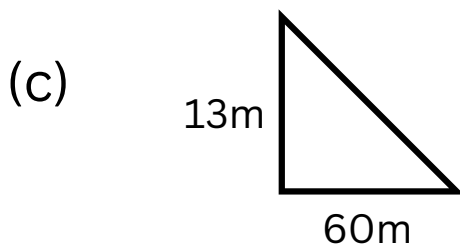
Q10 Work out the area of the each shape.



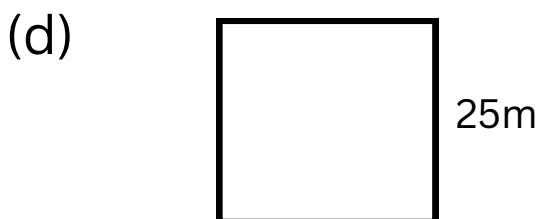
$$\begin{aligned}\text{Area} &= L \times W \\ \text{Area} &= 12 \times 3 \\ \text{Area} &= 36\text{cm}^2\end{aligned}$$



$$\begin{aligned}\text{Area} &= \frac{1}{2}(b \times h) \\ \text{Area} &= \frac{1}{2}(9 \times 5) \\ \text{Area} &= 22.5\text{ cm}^2\end{aligned}$$



$$\begin{aligned}\text{Area} &= \frac{1}{2}(b \times h) \\ \text{Area} &= \frac{1}{2}(60 \times 13) \\ \text{Area} &= 390\text{m}^2\end{aligned}$$



$$\begin{aligned}\text{Area} &= 4 \times L \\ \text{Area} &= 4 \times 25 \\ \text{Area} &= 100\text{m}^2\end{aligned}$$