

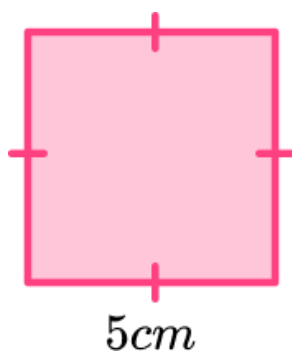
2D Shapes - Worksheet

Skill

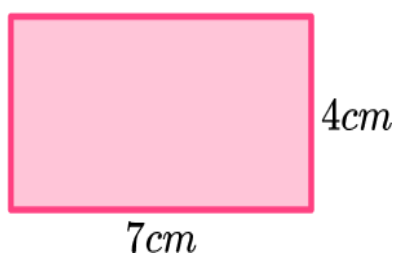
Group A - Perimeter of 2D shapes

Work out the perimeter of the shapes. Give your answers to 1 decimal place where necessary.

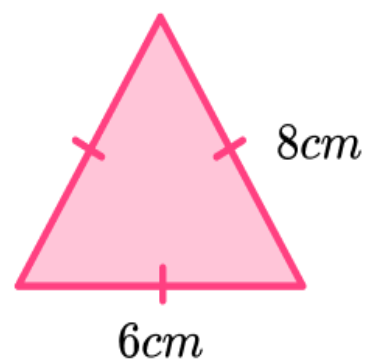
1)



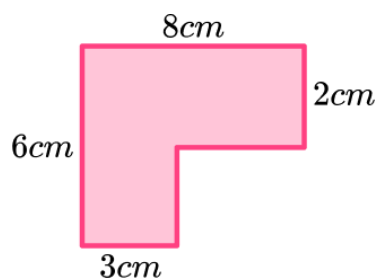
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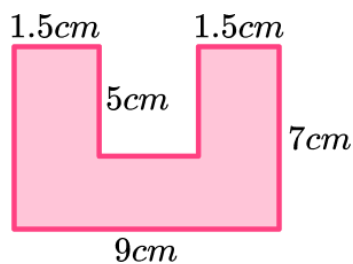
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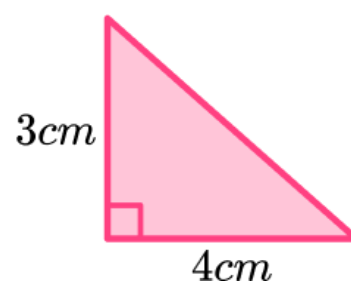
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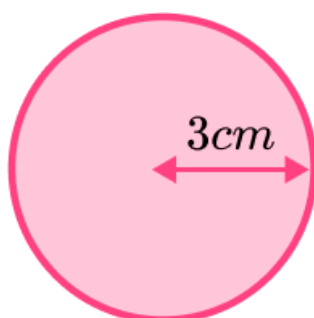
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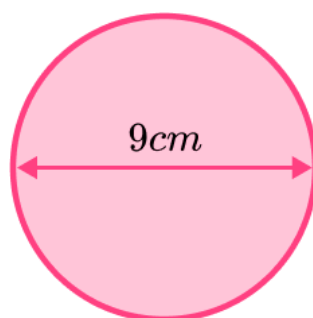
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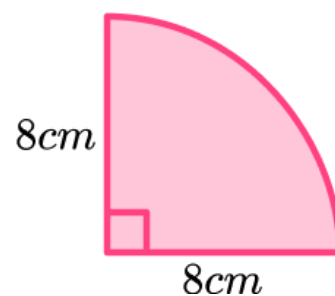
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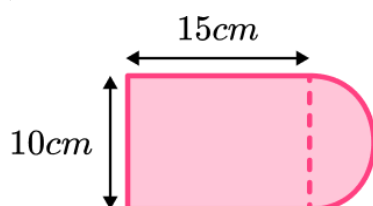
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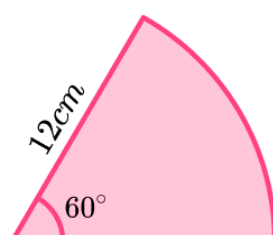
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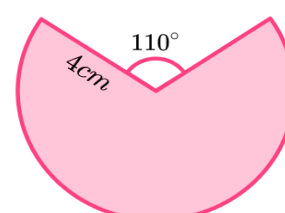
10)



11)



12)

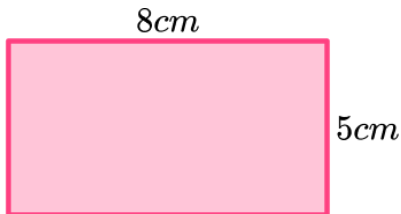


2D Shapes - Worksheet

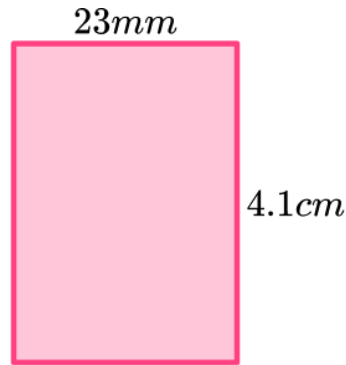
Group B - Area of 2D shapes

Work out the area of the shapes. Give your answers to 1 decimal place where necessary and be careful with units.

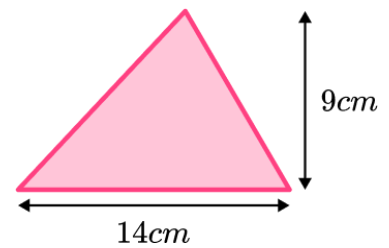
1)



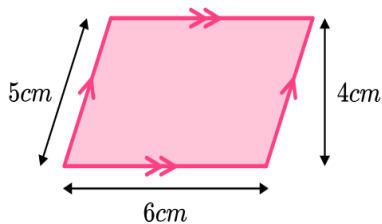
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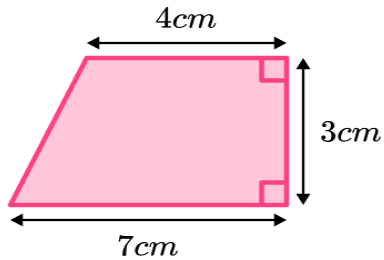
3)



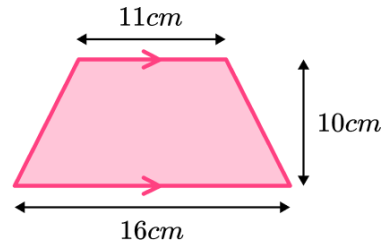
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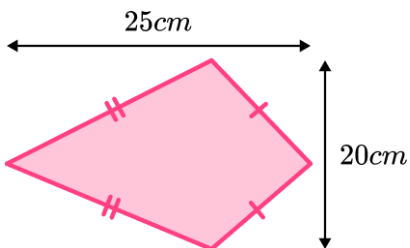
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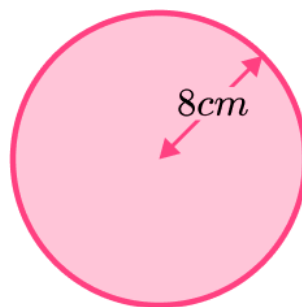
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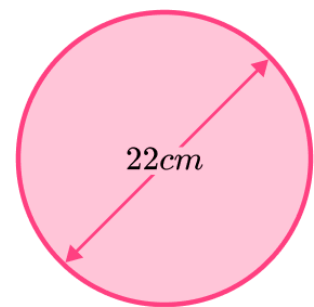
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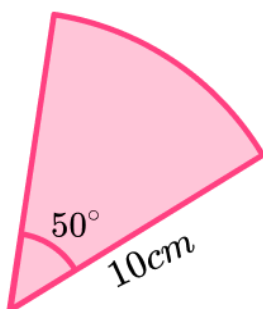
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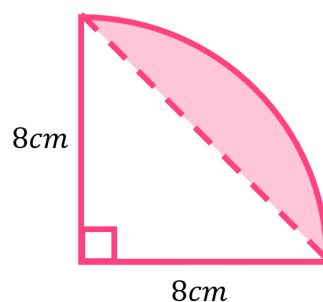
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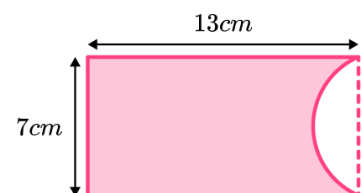
10)



11)



12)

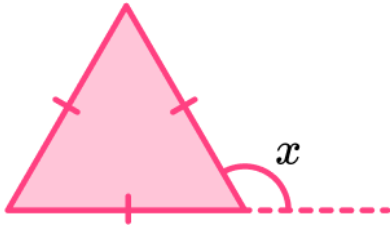


2D Shapes - Worksheet

Group C - Angles in polygons

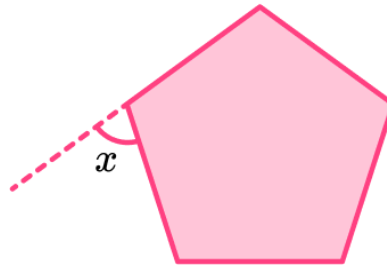
Find the required angle or value:

1) Find the size of x .



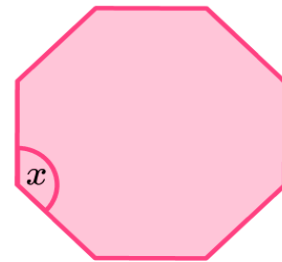
2) Find the size of x .

Regular Pentagon



3) Find the size of x .

Regular Octagon



4) The exterior angle of a regular nonagon.

5) The interior angle of a regular decagon.

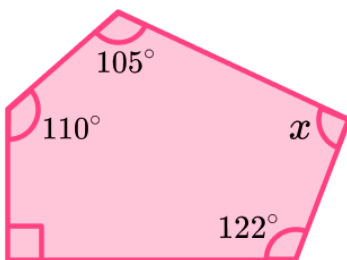
6) The sum of the interior angles of a 11-sided shape.

7) A regular polygon has an exterior angle of 20° . Find the number of sides.

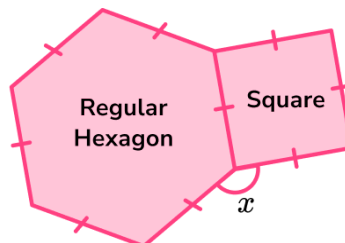
8) A regular polygon has an interior angle of 168° . Find the number of sides.

9) A polygon has an interior angle sum of 2340° . Find the number of sides.

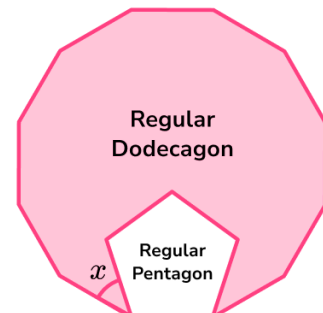
10) Find the size of x .



11) Find the size of x .



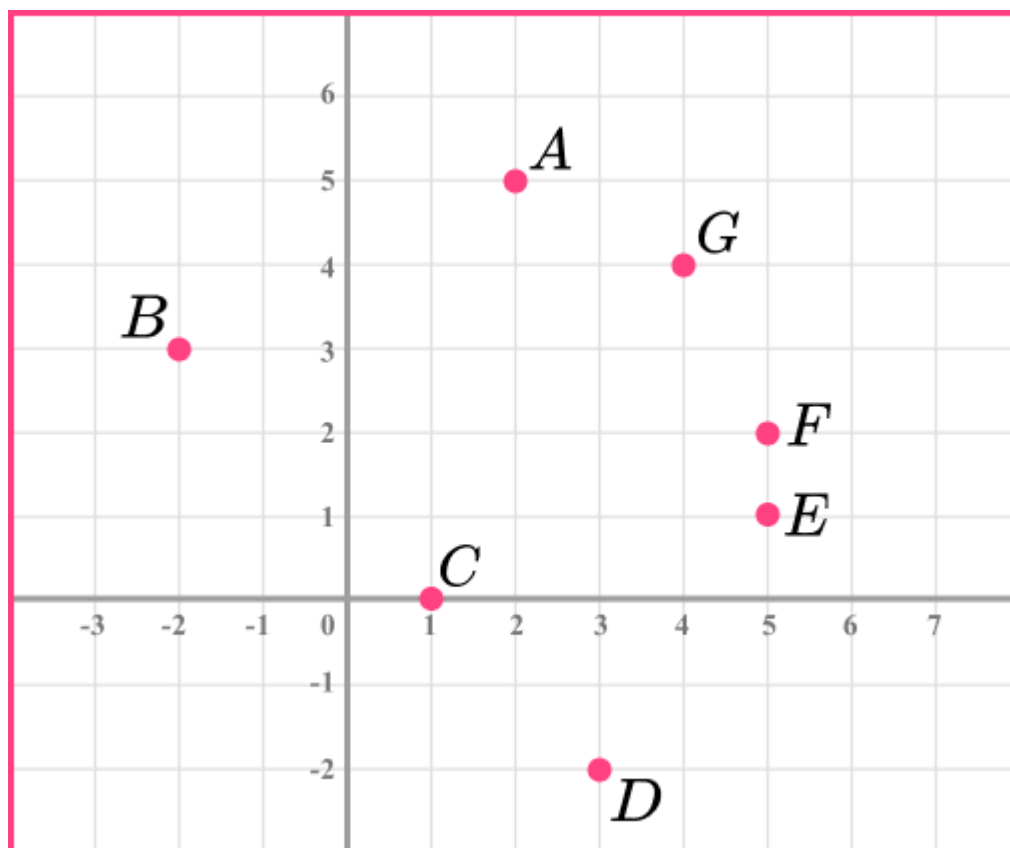
12) Find the size of x .



2D Shapes - Worksheet

Applied

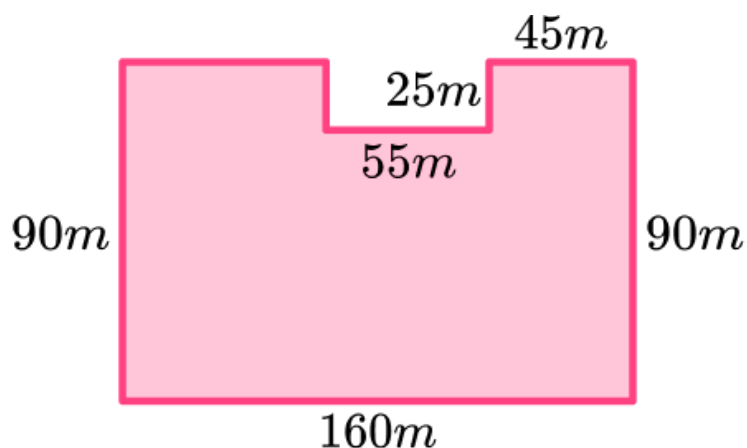
1)



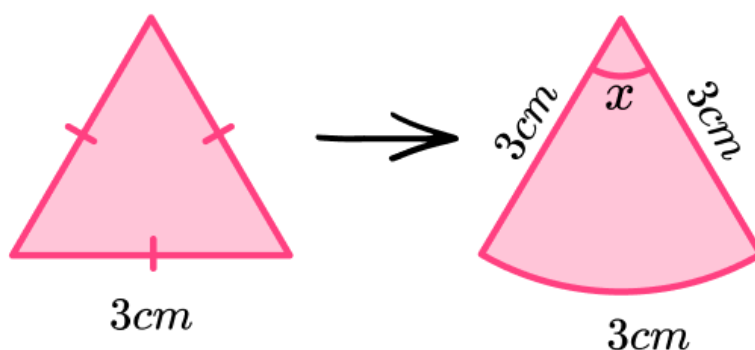
- (a) A , B and D are three vertices of a quadrilateral with one line of symmetry. Which point is the fourth vertex?
- (b) A , B and C are three vertices of a quadrilateral with no lines of symmetry but rotational symmetry order 2. Which point is the fourth vertex?

2D Shapes - Worksheet

- 2) A farmer wants to replace the fencing around the field shown in the diagram below.
- Stock fencing is sold in rolls of $100m$, each costing £150.
- How much will it cost the farmer to buy enough stock fencing for his field?



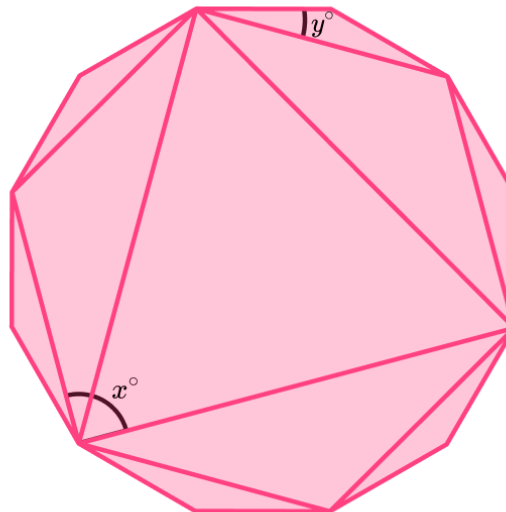
- 3) A jeweller has decided to change a previous design of an earring.
- The original shape was an equilateral triangle with sides $3cm$.
- The jeweller plans to bend one side of the triangle to create a sector with radius $3cm$ and arc length $3cm$.



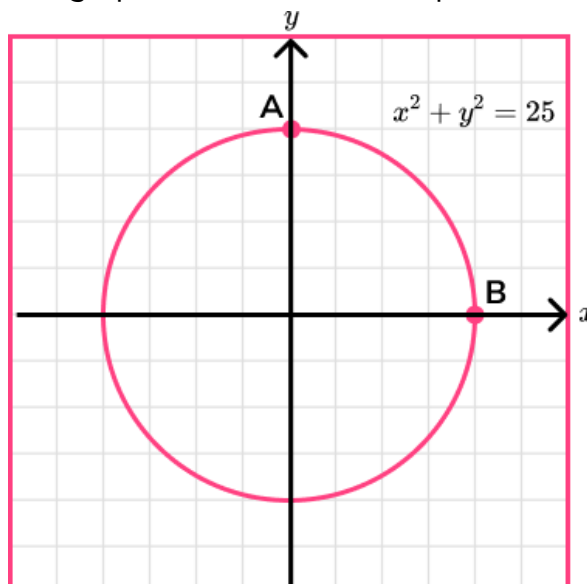
- (a) Find the angle x° of the sector. Give your answer to 3 significant figures.
- (b) Calculate the difference in the areas of the two shapes.

2D Shapes - Worksheet

- 4) A graphic designer is creating a new logo.
The logo is made from regular polygons.



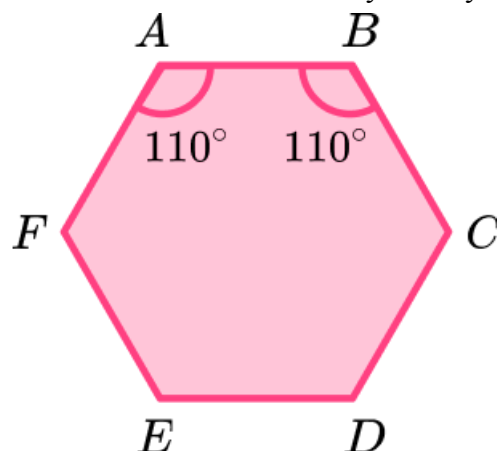
- (a) Find the size of angle x .
- (b) Find the size of angle y .
- 5) The diagram shows the graph of the circle with equation $x^2 + y^2 = 25$



- (a) State the coordinates of points A and B.
- (b) If 1 unit on the axes represents 1 cm, find the area and circumference of the circle in terms of π .

2D Shapes - Exam Questions

- 1) The hexagon $ABCDEF$ has one line of symmetry.



Angle FAB = angle ABC = 110°

Angle AFE = angle BCD .

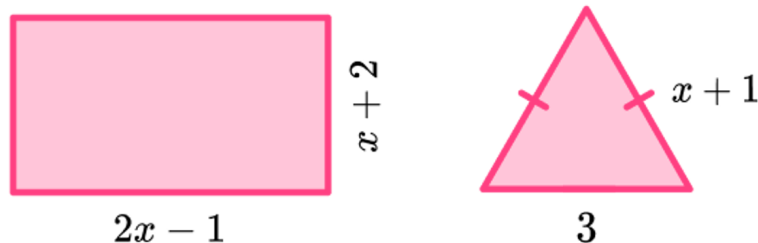
Angle FED = angle CDE .

Angle CDE : angle BCD = $3 : 2$.

Find the size of angle AFE .

..... $^\circ$
(5 marks)

- 2) The perimeter of the rectangle is twice the perimeter of the isosceles triangle. Measurements are in cm.

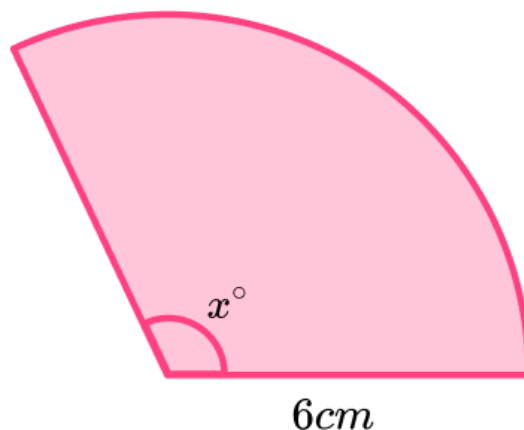


Find the area of the rectangle.

..... cm^2
(5 marks)

2D Shapes - Exam Questions

- 3) The sector has a perimeter 25cm and radius 6cm .



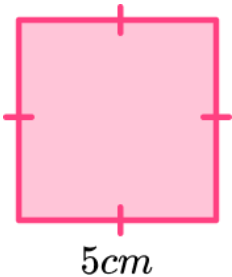
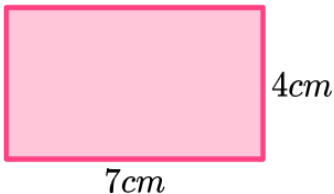
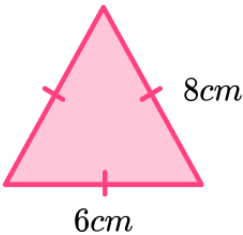
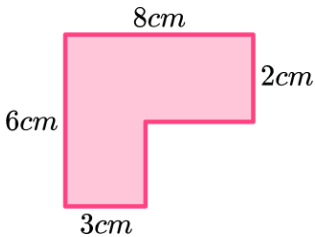
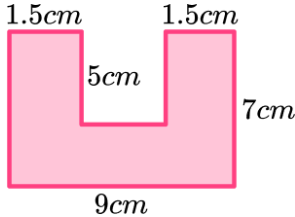
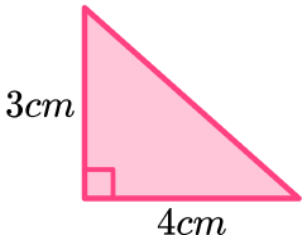
Find the size of angle x . Give your answer to 3 significant figures.

.....
(3 marks)

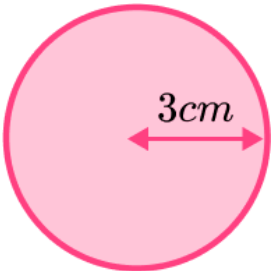
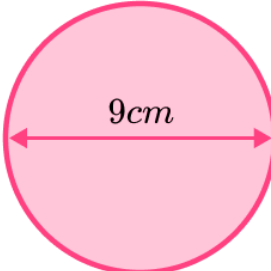
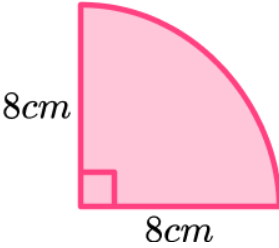
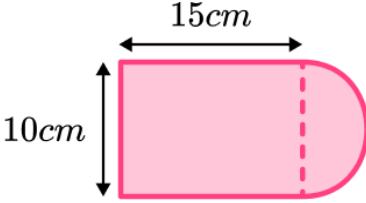
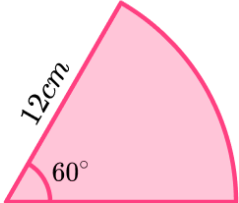
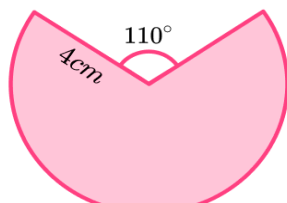
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- 4) A regular polygon has interior angles and exterior angles in the ratio $13 : 2$.
Find the number of sides.

.....
(3 marks)


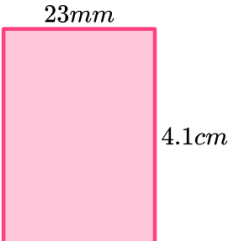
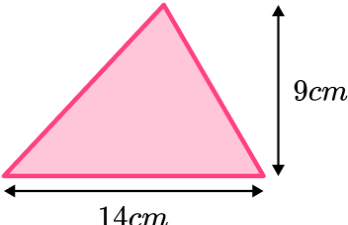
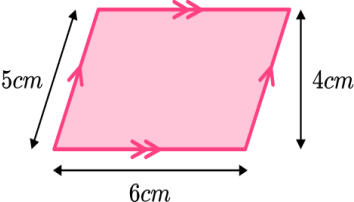
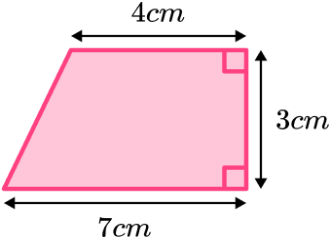
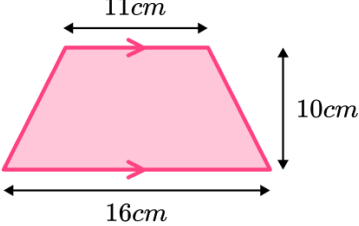
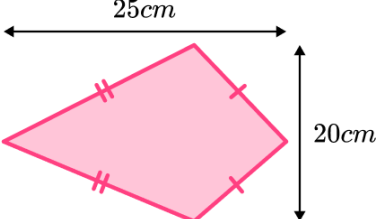
2D Shapes - Answers

| | Question | Answer |
|---------|---|---|
| | Skill Questions | |
| Group A | <p>Work out the perimeter of the shapes:</p> <p>1) </p> <p>2) </p> <p>3) </p> <p>4) </p> <p>5) </p> <p>6) </p> | <p>1) 20cm</p> <p>2) 22cm</p> <p>3) 22cm</p> <p>4) 28cm</p> <p>5) 42cm</p> <p>6) 12cm</p> |

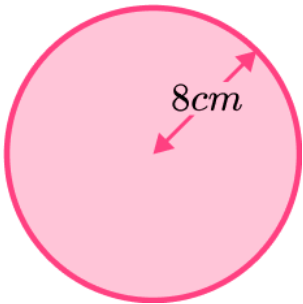
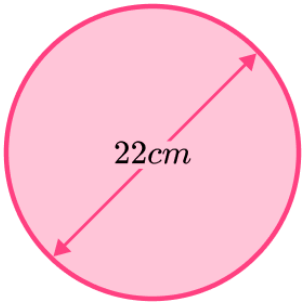
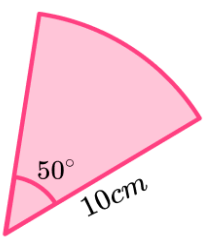
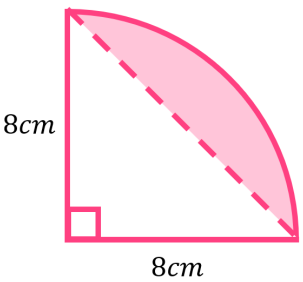
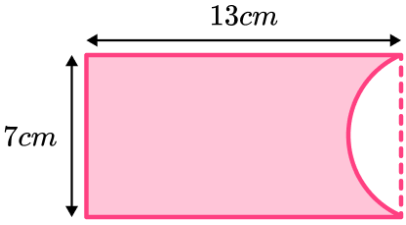
2D Shapes - Answers

| | | |
|------------------|---|--|
| Group A contd | <p>7) </p> <p>8) </p> <p>9) </p> <p>10) </p> <p>11) </p> <p>12) </p> | <p>7) 6π cm or 18.8 cm (1 d.p.)</p> <p>8) 9π cm or 28.3 cm (1 d.p.)</p> <p>9) 28.6 cm (1 d.p.)</p> <p>10) 55.7 cm (1 d.p.)</p> <p>11) 36.6 cm (1 d.p.)</p> <p>12) 25.5 cm (1 d.p.)</p> |
|------------------|---|--|

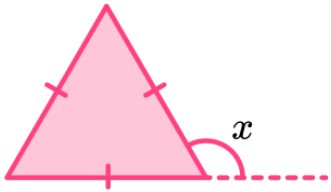
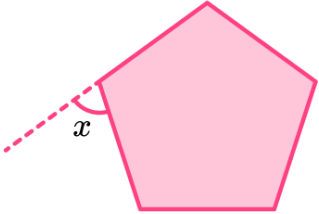
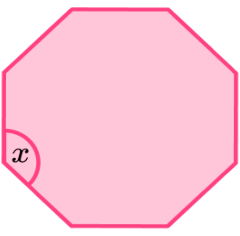
2D Shapes - Answers

| Group B | Work out the area of the shapes: | |
|---------|---|----------------------|
| | <p>1) </p> | 1) 40cm^2 |
| | <p>2) </p> | 2) 9.43cm^2 |
| | <p>3) </p> | 3) 63cm^2 |
| | <p>4) </p> | 4) 24cm^2 |
| | <p>5) </p> | 5) 16.5cm^2 |
| | <p>6) </p> | 6) 135cm^2 |
| | <p>7) </p> | 7) 250cm^2 |

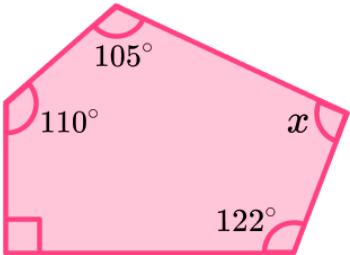
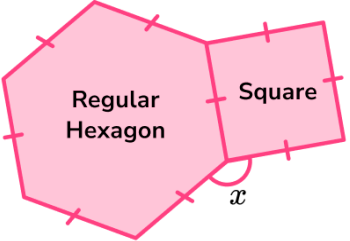
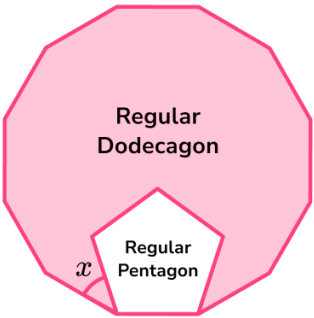
2D Shapes - Answers

| | | |
|------------------|--|--|
| Group B contd | <p>8) </p> <p>9) </p> <p>10) </p> <p>11) </p> <p>12) </p> | <p>8) $64\pi \text{ cm}^2$ or 201.1 cm^2 (1 d.p.)</p> <p>9) $121\pi \text{ cm}^2$ or 380.1 cm^2 (1 d.p.)</p> <p>10) 43.6 cm^2 (1 d.p.)</p> <p>11) 18.3 cm^2 (1 d.p.)</p> <p>12) 71.8 cm^2 (1 d.p.)</p> |
|------------------|--|--|

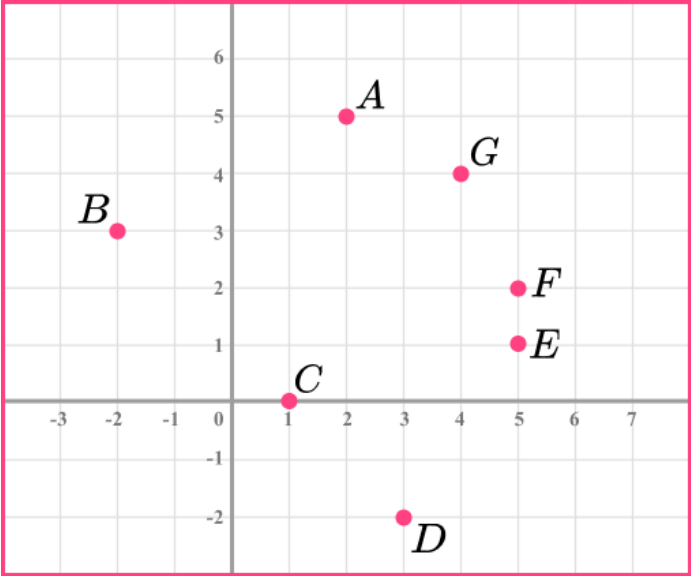
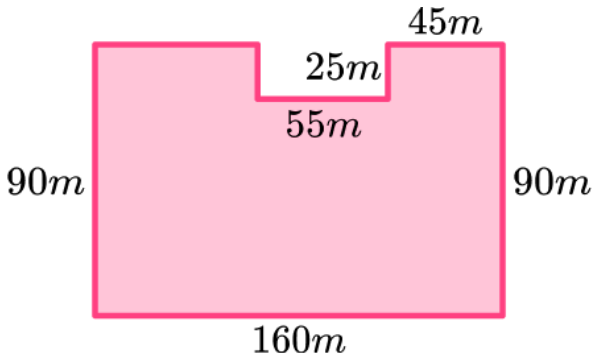
2D Shapes - Answers

| | | |
|---------|---|---|
| Group C | <p>Find the required angle or value:</p> <p>1) Find the size of x.</p>  <p>2) Find the size of x.</p> <p>Regular Pentagon</p>  <p>3) Find the size of x.</p> <p>Regular Octagon</p>  <p>4) The exterior angle of a regular nonagon.</p> <p>5) The interior angle of a regular decagon.</p> <p>6) The sum of the interior angles of a 11-sided shape.</p> <p>7) A regular polygon has an exterior angle of 20°. Find the number of sides.</p> <p>8) A regular polygon has an interior angle of 168°. Find the number of sides.</p> <p>9) A polygon has an interior angle sum of 2340°. Find the number of sides.</p> | <p>1) 120°</p> <p>2) 72°</p> <p>3) 135°</p> <p>4) 40°</p> <p>5) 144°</p> <p>6) 1620°</p> <p>7) 18</p> <p>8) 30</p> <p>9) 15</p> |
|---------|---|---|

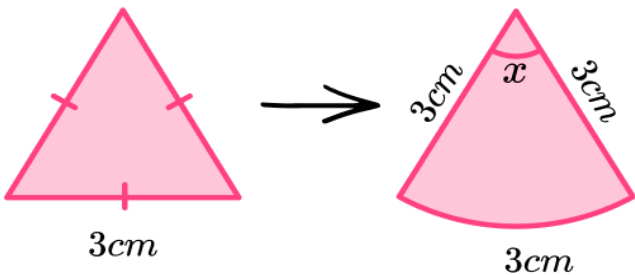
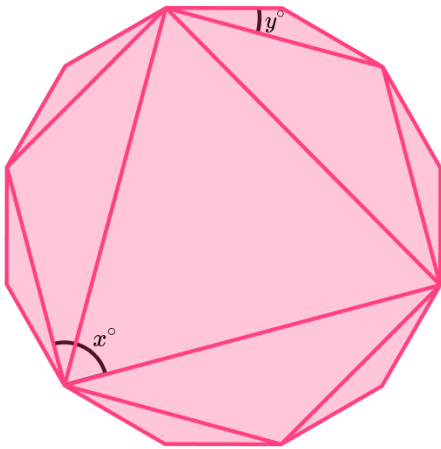
2D Shapes - Answers

| | | |
|------------------|--|---|
| Group C contd | <p>10) Find the size of x.</p>  <p>11) Find the size of x.</p>  <p>12) Find the size of x.</p>  | <p>10) 113°</p> <p>11) 150°</p> <p>12) 42°</p> |
|------------------|--|---|

2D Shapes - Answers

| | Question | Answer |
|----|--|--|
| | Applied Questions | |
| 1) |  <p>a) A, B and D are three vertices of a quadrilateral with one line of symmetry. What point is the fourth vertex?</p> <p>b) A, B and C are three vertices of a quadrilateral with no lines of symmetry but rotational symmetry order 2. What point is the fourth vertex?</p> | <p>a) F</p> <p>b) F</p> |
| 2) | <p>A farmer wants to replace the fencing around the field shown in the diagram below. Stock fencing is sold in rolls of $100m$, each costing $\pounds 150$. How much will it cost the farmer to buy enough stock fencing for his field?</p>  | <p>Perimeter = $550m$ Cost = $\pounds 900$</p> |

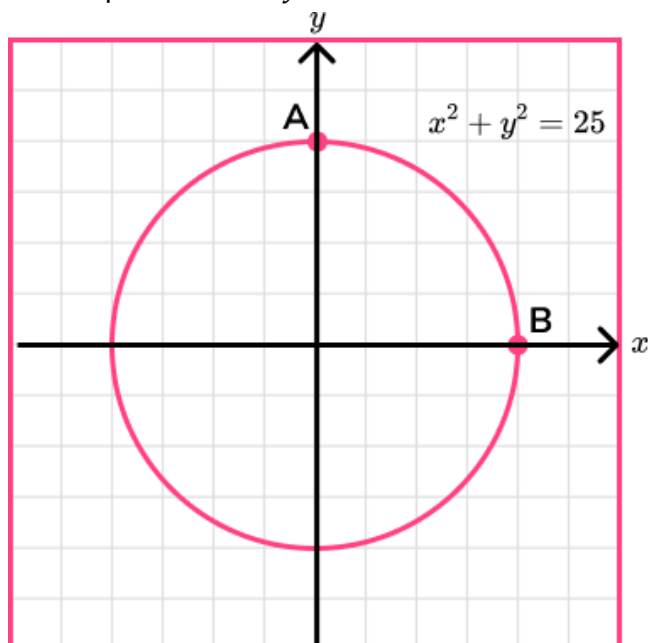
2D Shapes - Answers

| | | |
|------------------|---|---|
| <p>3)</p> | <p>A jeweller has decided to change a previous design of an earring.</p> <p>The original shape was an equilateral triangle with sides 3cm. The jeweller plans to bend one side of the triangle to create a sector with radius 3cm and arc length 3cm.</p>  <p>a) Find the angle x° of the sector.</p> <p>b) Calculate the difference in the areas of the two shapes.</p> | <p>a) 57.3° (1 d.p.)</p> <p>b) Triangle = $3.89711\dots\text{cm}^2$ Sector = 4.5cm^2 Difference = 0.60cm^2</p> |
| <p>4)</p> | <p>A graphic designer is creating a new logo. The logo consists of regular polygons.</p>  <p>a) Find x</p> <p>b) Find y</p> | <p>a) 90°</p> <p>b) 15°</p> |

2D Shapes - Answers

5)

The diagram shows the graph of the circle with equation $x^2 + y^2 = 25$



a) State the coordinates of points A and B.

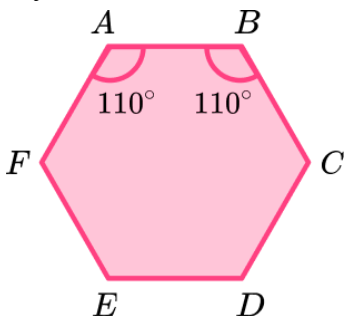
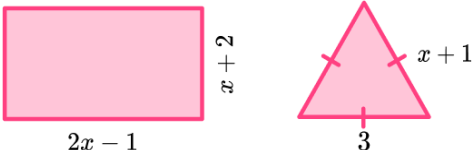
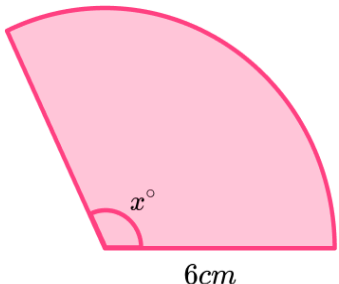
b) If 1 unit on the axes represents 1 cm, find the area and circumference of the circle in terms of π .

a) **A** = (0, 5)

B = (5, 0)

b) Area = $25\pi\text{cm}^2$
Circumference = $10\pi\text{cm}$

2D Shapes - Mark Scheme

| | Question | Answer |
|----|--|---|
| | Exam Questions | |
| 1) | <p>The hexagon ABCDEF has one line of symmetry.</p>  <p>Angle $FAB = \text{angle } ABC = 110^\circ$ Angle $AFE = \text{angle } BCD$. Angle $FED = \text{angle } CDE$. Angle $CDE : \text{angle } BCD = 3 : 2$.</p> <p>Find the size of angle AFE.</p> | <p>Indicating sum of angles is 720° or 540° if line of symmetry used to form a pentagon (1)</p> <p>$720 - (110 + 110) = 500$ or $540 - (110 + 180) = 250$ (1)</p> <p>Use of ratio 3: 2 or $3x$ and $2x$ seen or $5x = 250$ (1)</p> <p>$x = 50$ (1)</p> <p>Angle $AFE = 100^\circ$ (1)</p> |
| 2) | <p>The perimeter of the rectangle is twice the perimeter of the isosceles triangle. Measurements are in cm.</p>  <p>Find the area of the rectangle.</p> | <p>$6x + 2$ or $2x + 5$ seen (1)</p> <p>$6x + 2 = 2(2x + 5)$ oe (1)</p> <p>$x = 4$ (1)</p> <p>$2x - 1 = 2(4) - 1 = 7$ and $x + 2 = (4) + 2 = 6$ (1)</p> <p>$(6 \times 7) = 42 \text{ cm}^2$ (1)</p> |
| 3) | <p>The sector has a perimeter 25cm and radius 6cm.</p>  <p>Find the size of angle x. Give your answer to 3 significant figures.</p> | <p>Sight of arc length given as 13cm (1)</p> <p>$\frac{x}{360} \times 2 \times \pi \times 6 = 13$ oe (1)</p> <p>$x = 124^\circ$ (1)</p> |

2D Shapes - Mark Scheme

| | | | |
|----|--|--------------------------------|-----|
| 4) | A regular polygon has interior angles and exterior angles in the ratio 13 : 2 Find the number of sides. | $180 \div 5 = 24$ oe | (1) |
| | | 156° or 24° seen | (1) |
| | | 15 sides | (1) |

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