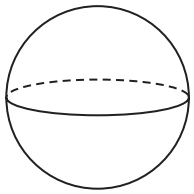
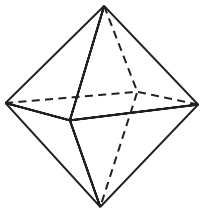
1 The diagram shows some 3-D shapes.

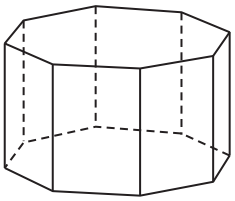
Shape A



Shape B



Shape C



(a) What is the mathematical name of shape **A**?

Sphere (1)

(1)

(b) How many edges has shape **B**?

12 (1)

(1)

(c) How many faces has shape **C**?

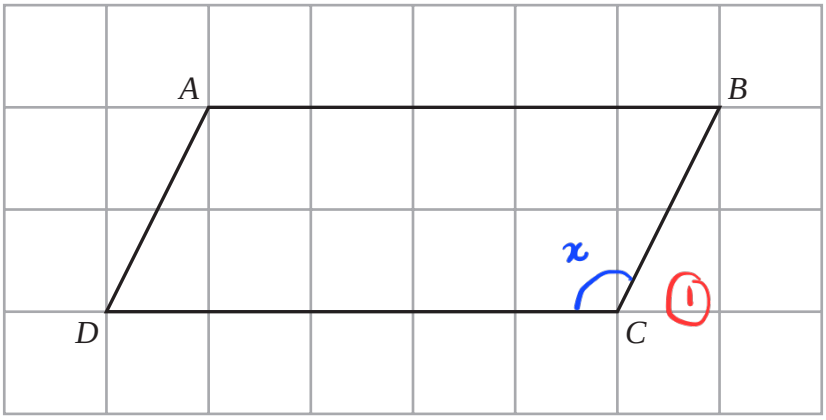
faces = flat surfaces

10 (1)

(1)

(Total for Question 1 is 3 marks)

2 The diagram shows a quadrilateral *ABCD* drawn on a square grid.



(a) Measure the length of *BC*.

3.1 ✓ ..... cm

(1)

(b) Write down the mathematical name of quadrilateral *ABCD*.

Parallelogram ✓ .....

(1)

(c) Write down the order of rotational symmetry of quadrilateral *ABCD*.

number of times a shape can fit into itself when rotated 360° about its centre.

2 ✓ .....

(1)

(d) On the diagram, mark an obtuse angle with the letter *x*.

(1)

Obtuse angle = $90° < x < 180°$

Here is a diagram of a trapezium.

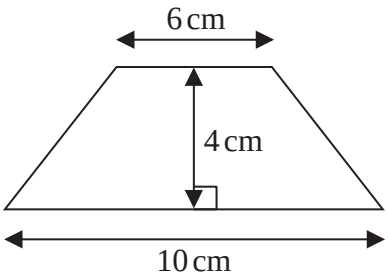


Diagram **NOT** accurately drawn

(e) Work out the area of the trapezium.

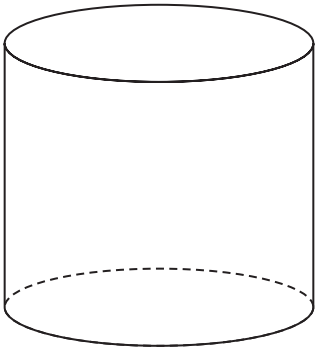
Area = $\frac{1}{2} \times (10 + 6) \times 4 = 32\ cm^2$ (1) (1)

32 ..... cm^2

(2)

(Total for Question 2 is 6 marks)

3 (a) Write down the mathematical name of this 3-D shape.



cylinder (1)

.....

(1)

Here is a solid cuboid.

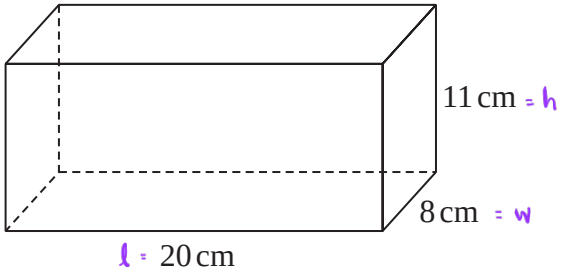


Diagram **NOT** accurately drawn

(b) (i) How many faces has the cuboid?

6 (1)

.....

(ii) How many vertices has the cuboid?

8 (1)

.....

(2)

(c) Work out the volume of the cuboid.

volume of cuboid = l x w x h

V = 20 x 8 x 11 (1)

= 1760 (1)

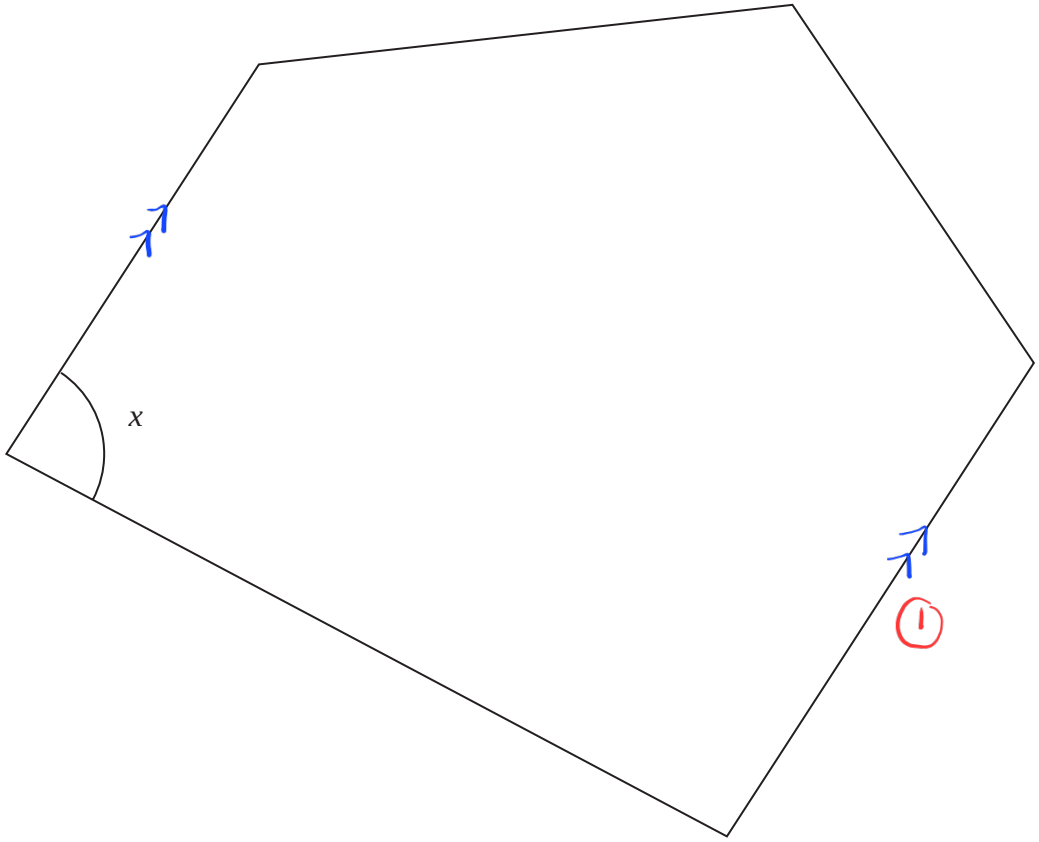
1760

..... cm^3

(2)

(Total for Question 3 is 5 marks)

4 Here is a polygon with five sides.



(a) Write down the mathematical name of a polygon with five sides.

pentagon (1)

.....

(1)

(b) Measure the size of the angle marked *x*.

85 (1) °

.....

(1)

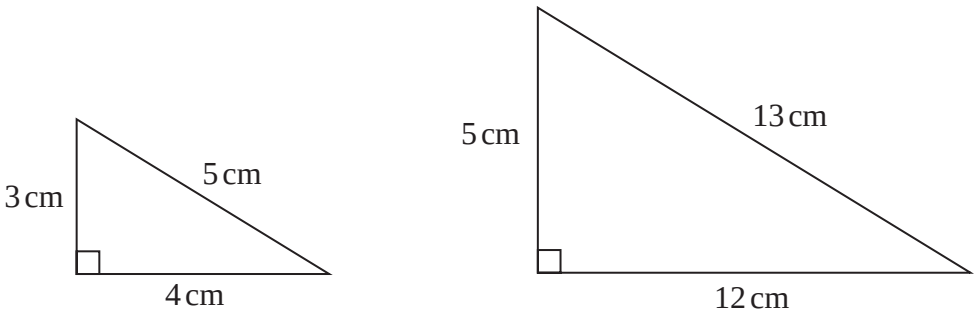
Two sides of the polygon are parallel. lines will never meet

(c) On the polygon, mark with arrows (>>) this pair of parallel lines.

(1)

Here are two triangles.

Diagram **NOT** accurately drawn



Triangle **A** Triangle **B**

(d) Are triangle **A** and triangle **B** similar triangles?
You must give a reason for your answer.

No. Because $12 \div 4 = 3$ but $13 \div 5$ does not equal to 3. (1)

(1)

(Total for Question 4 is 4 marks)

5 Here is a 10-sided polygon.

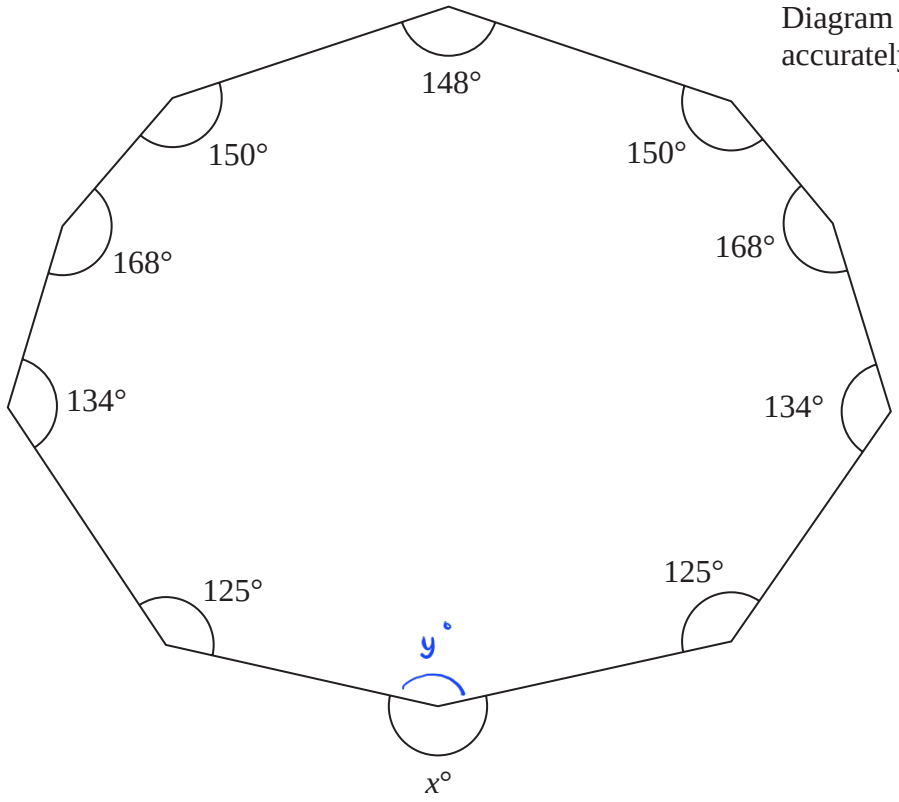


Diagram **NOT** accurately drawn

Work out the value of x.

angle inside polygon : $(n-2) \times 180^\circ$

$: (10-2) \times 180^\circ = 1440^\circ$ (1)

$125^\circ + 134^\circ + 168^\circ + 150^\circ + 148^\circ + 150^\circ + 168^\circ + 134^\circ + 125^\circ + y^\circ = 1440^\circ$

$y^\circ = 1440^\circ - 1302^\circ$

$= 138^\circ$ (1)

$\therefore x^\circ = 360^\circ - y^\circ$

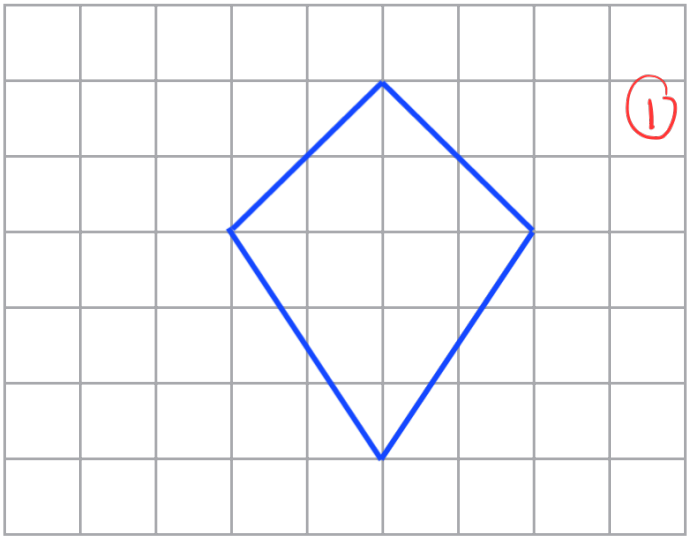
$: 360^\circ - 138^\circ$ (1)

$: 222^\circ$ (1)

$x =$ 222°

(Total for Question 5 is 4 marks)

6 (a) On the grid below, draw a kite.



(1)

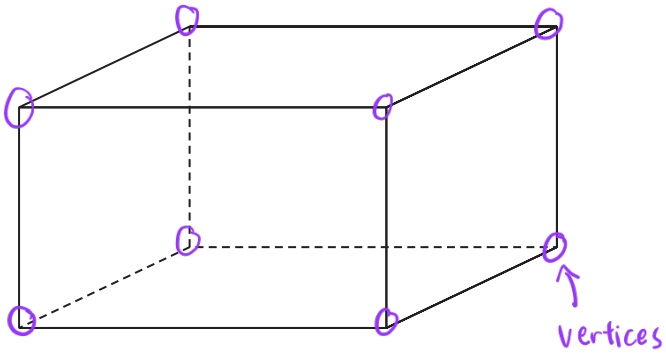
(b) Write down the mathematical name of an 8-sided polygon.

Octagon (1)

.....

(1)

Here is a solid prism.



(c) (i) Write down the mathematical name of this prism.

cuboid (1)

.....

(ii) How many vertices does the prism have?

8 (1)

.....

(2)

(Total for Question 6 is 4 marks)

7 The diagram shows a rectangle and a diagonal of the rectangle.

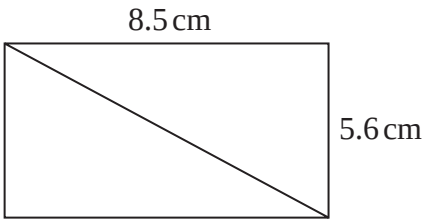


Diagram **NOT** accurately drawn

Work out the length of the diagonal of the rectangle.
Give your answer correct to 1 decimal place.

Using Pythagoras' theorem :

diagonal $= \sqrt{8.5^2 + 5.6^2}$ (1)

$= \sqrt{103.61}$ (1)

$= 10.2$ (1)

10.2 ..... cm

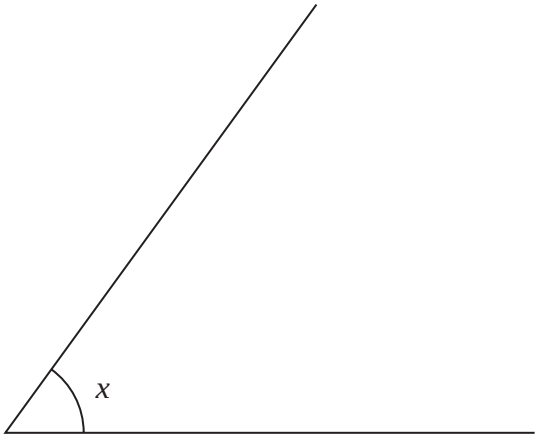
(Total for Question 7 is 3 marks)

8 (a) Write down the order of rotational symmetry of a square.

4 (1)

.....

(1)



(b) (i) Measure the size of the angle marked *x*.

54 (1) °

.....

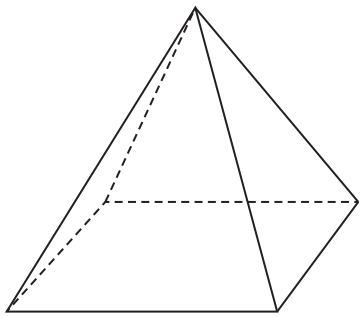
(ii) Write down the mathematical name of this type of angle.

Acute (1)

.....

(2)

Here is a 3-D shape.



(c) (i) Write down the mathematical name of this 3-D shape.

Pyramid (1)

.....

(ii) How many edges does this shape have?

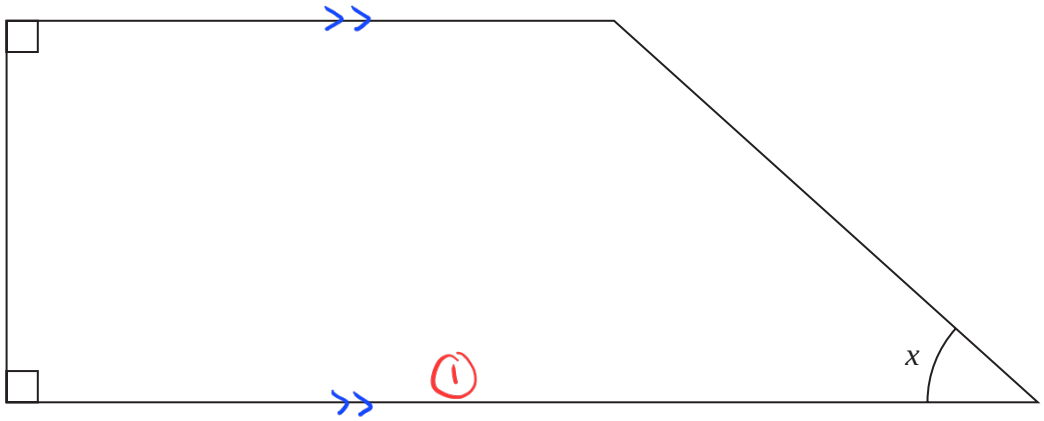
8 (1)

.....

(2)

(Total for Question 8 is 5 marks)

9 Here is a quadrilateral.



(a) What is the mathematical name of this quadrilateral?

Trapezium (1)

.....

(1)

(b) Measure the size of the angle marked *x*.

42 (1) °

.....

(1)

(c) On the quadrilateral, mark with arrows (≫) a pair of parallel lines.

(1)

The quadrilateral has four angles.

90°

(d) How many of these angles are right angles?

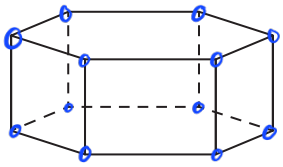
2 (1)

.....

(1)

(Total for Question 9 is 4 marks)

10 The diagram shows a solid prism.



(a) How many vertices has the prism?

12 (1)

.....

(1)

(b) How many faces has the prism?

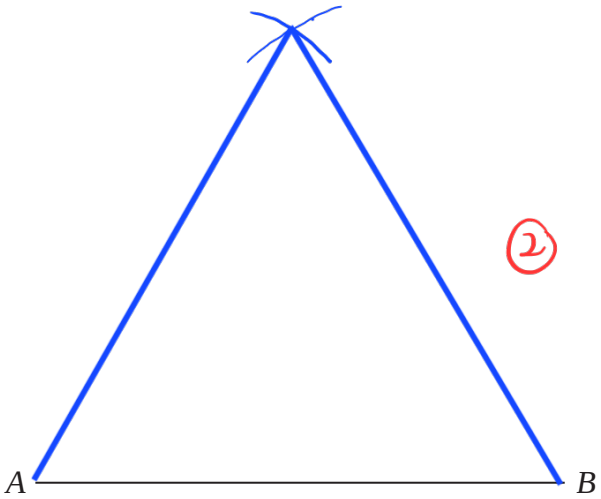
8 (1)

.....

(1)

(c) Using ruler and compasses only, in the space below construct the equilateral triangle *ABC* with sides of length 7 cm.
You must show all your construction lines.

Side *AB* has already been drawn for you.

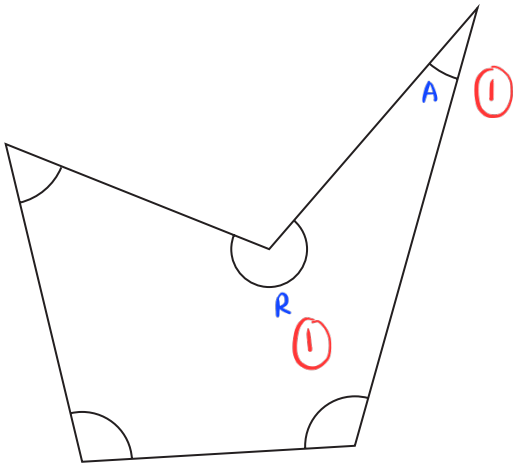


(2)

(2)

(Total for Question 10 is 4 marks)

11 Here is a 5-sided polygon.



(a) Write down the mathematical name for a 5-sided polygon.

Pentagon 1

(1)

(b) On the diagram, mark with a letter *A* an acute angle.

acute angle = less than 90°

(1)

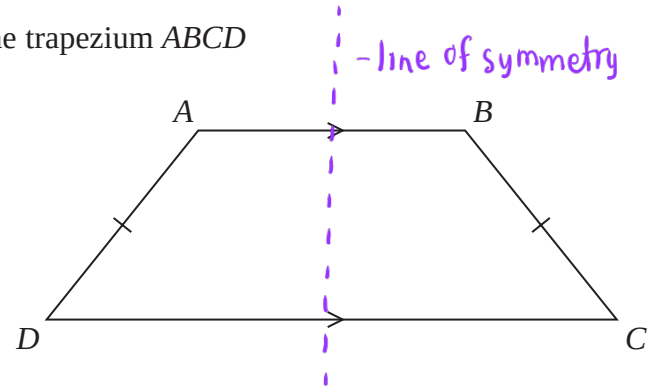
(c) On the diagram, mark with a letter *R* a reflex angle.

reflex angle = $180° < x < 360°$

(1)

(Total for Question 11 is 3 marks)

12 The diagram shows the trapezium *ABCD*



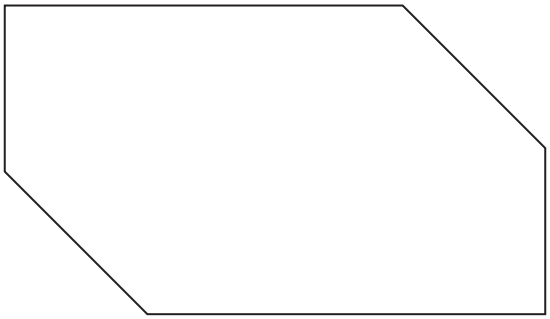
(a) How many lines of symmetry has *ABCD*?

1 (1)

.....

(1)

Here is another shape.



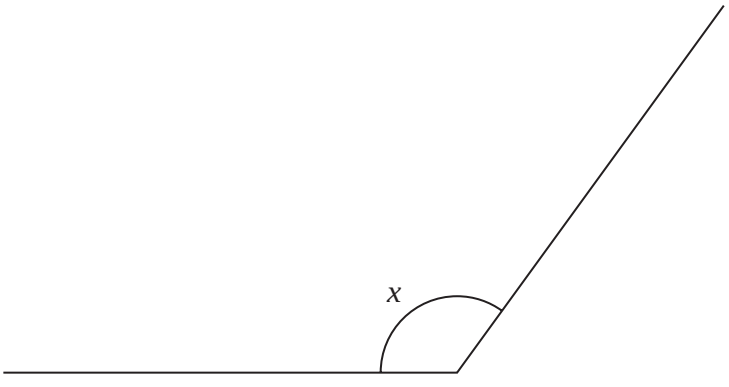
(b) Write down the order of rotational symmetry of this shape.

2 (1)

.....

(1)

(c) Find, by measuring, the size of the angle marked *x*



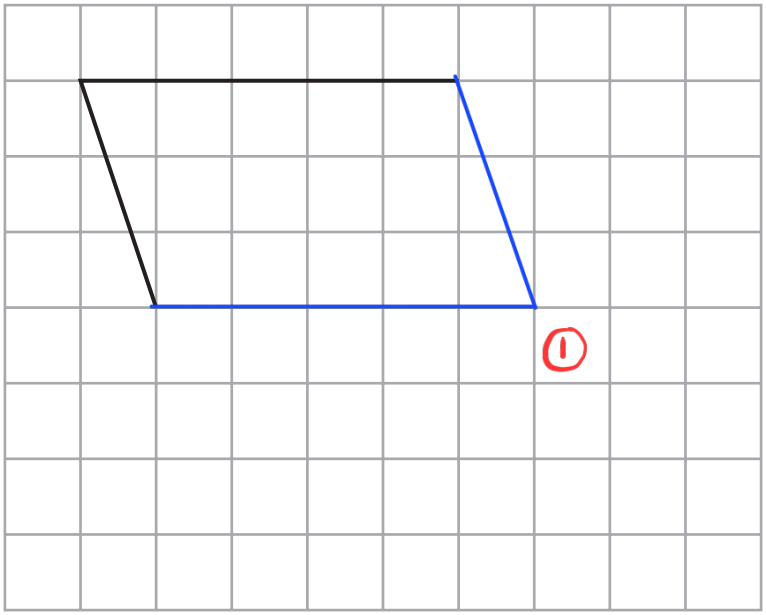
126 (1) °

.....

(1)

(Total for Question 12 is 3 marks)

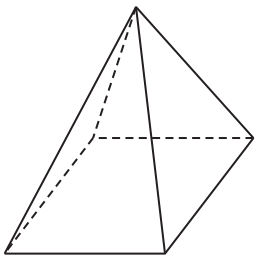
13 Here are two sides of a parallelogram.



(a) On the grid above, complete the parallelogram.

(1)

The diagram shows a 3-D shape.



(b) (i) What is the mathematical name of this 3-D shape?

Pyramid (1)

.....

(1)

(ii) How many faces has this shape?

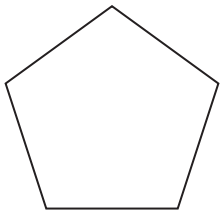
5 (1)

.....

(1)

(Total for Question 13 is 3 marks)

14 Here is a polygon.



(a) Write down the mathematical name of this polygon.

Pentagon (1)

(1)

(Total for Question 14 is 1 marks)

15 The diagram shows parts of three regular polygons, **A**, **B** and **C**, meeting at a point.

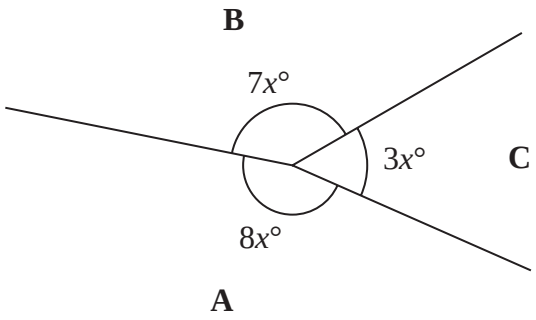


Diagram **NOT** accurately drawn

Polygon **B** has n sides.

Work out the value of n.

$7x + 3x + 8x = 360^\circ$ (1)

$18x = 360^\circ$

$x = 20^\circ$ (1)

$\frac{(n-2) \times 180^\circ}{n} = 7 \times 20^\circ$ (1)

$180^\circ n - 360^\circ = 140n$

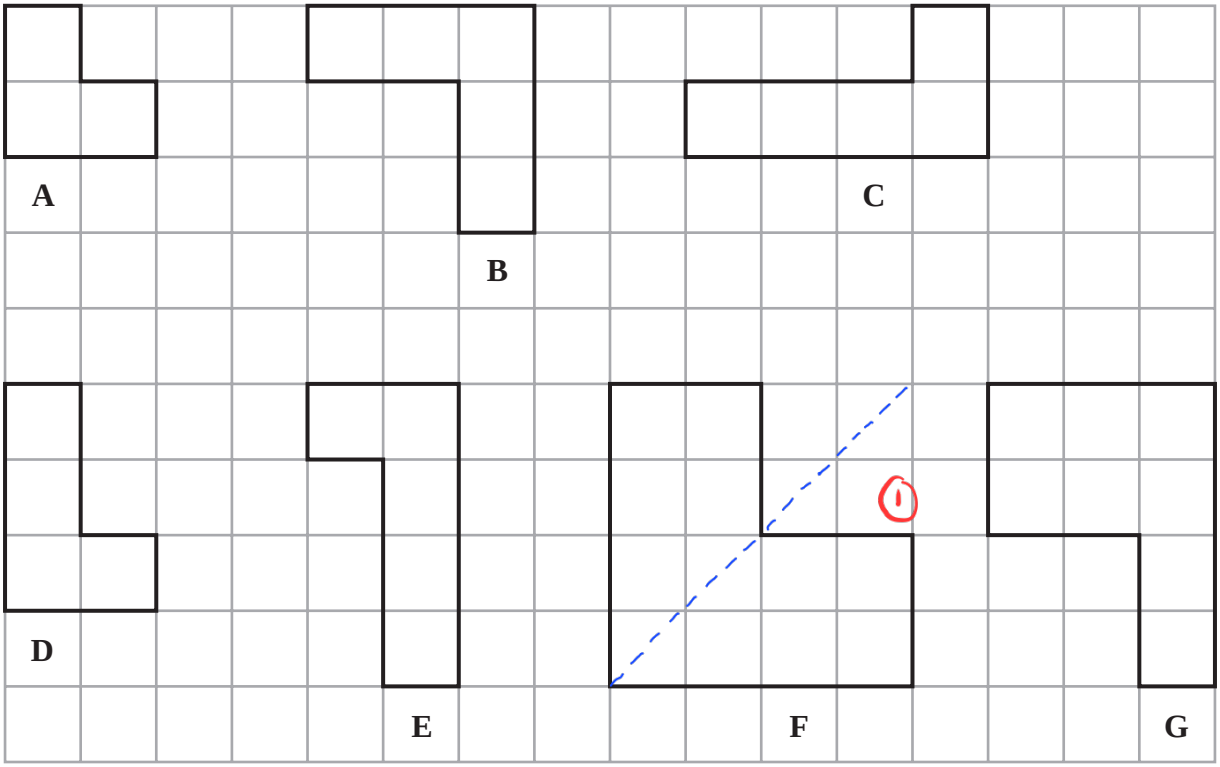
$40^\circ n = 360^\circ$

$n = 9$ (1)

$n =$ 9

(Total for Question 15 is 4 marks)

16 Here are seven shapes on a centimetre grid.



(a) Write down the letters of the two shapes that are congruent.

C and E

(1) 1

Two of the seven shapes are similar but are not congruent.

(b) Write down the letters of these two shapes.

A and F

(1) 1

Shape **F** has exactly one line of symmetry.

(c) On shape **F** on the grid, draw this line of symmetry.

(1)

(d) Work out the perimeter of shape **B**.

12 1 cm

(1)

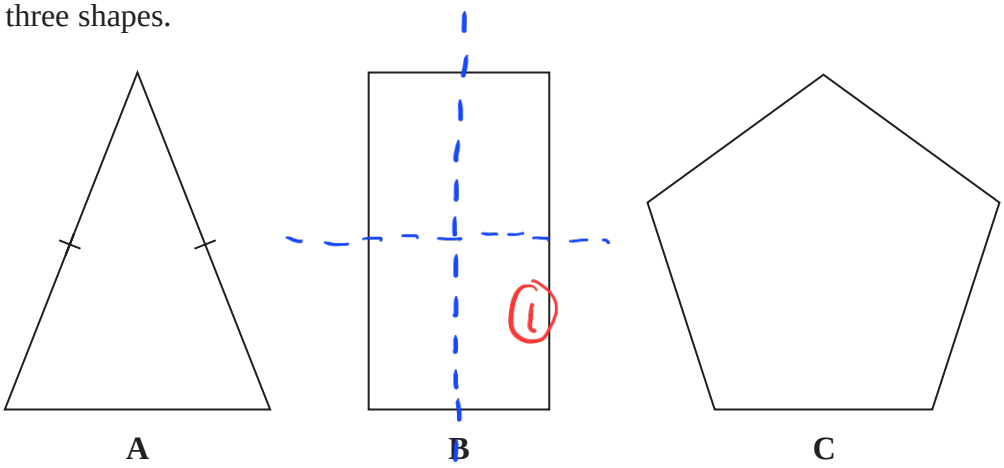
(e) Work out the area of shape **G**.

8 1 cm^2

(1)

(Total for Question 16 is 5 marks)

17 Here are three shapes.



Shape **A** is a triangle.

(a) Write down the mathematical name for this type of triangle.

Isosceles (1)

(1)

Shape **B** is a rectangle.

(b) On shape **B**, draw its lines of symmetry.

(1)

Shape **C** is a regular polygon.

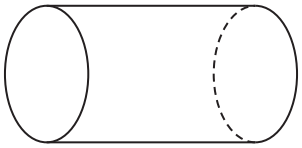
(c) Write down the order of rotational symmetry of shape **C**.

5 (1)

(1)

(Total for Question 17 is 3 marks)

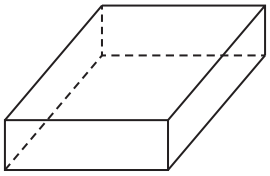
18 (a) Write down the mathematical name of this 3-D shape.



cylinder (1)

(1)

Here is a solid prism.



(b) How many edges has the prism?

12 (1)

(1)

(Total for Question 18 is 2 marks)

19 Here is a quadrilateral.

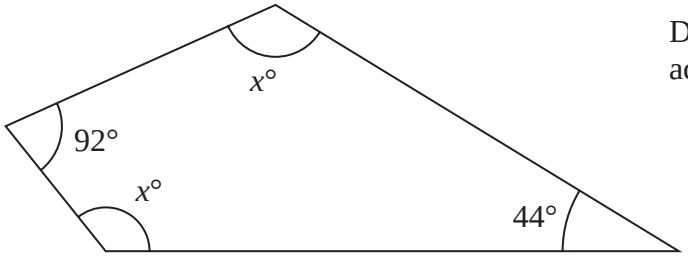


Diagram **NOT** accurately drawn

(i) Work out the value of x

$360 - (92 + 44) = 224$ (1)

$2x = 224$ (1)

$x = \frac{224}{2}$

$= 112$ (1)

$x =$ 112

(3)

(ii) Give a reason for your answer.

Angles in a quadrilateral sum up to 360° (1)

(1)

(Total for Question 19 is 4 marks)

20 The diagram shows a regular octagon *ABCDEFGH* and a regular pentagon *ABIJK*

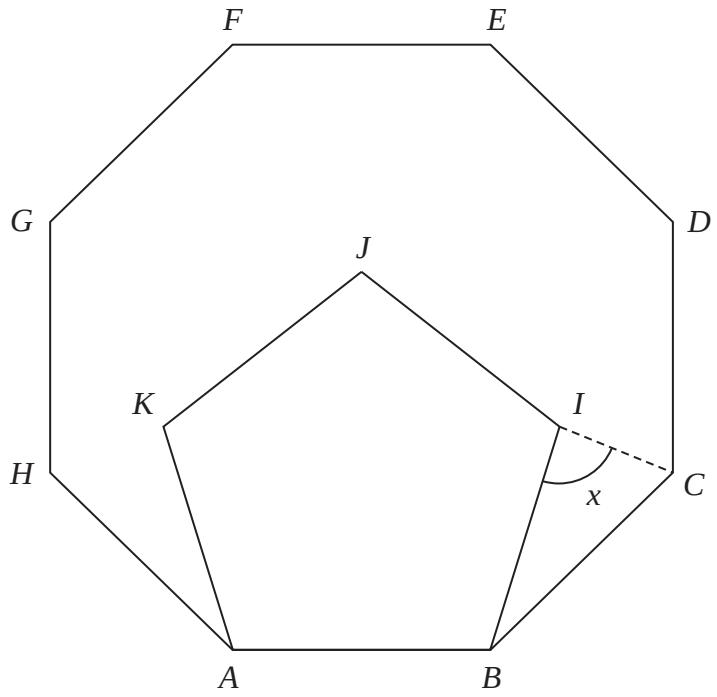


Diagram **NOT** accurately drawn

Work out the size of the angle *x*

Interior angle :

octagon : $180^\circ - (360 \div 8) = 135^\circ$ (1)

pentagon : $180^\circ - (360 \div 5) = 108^\circ$

$IBC = 135^\circ - 108^\circ$ (1)

$= 27^\circ$

since BCI is isosceles,

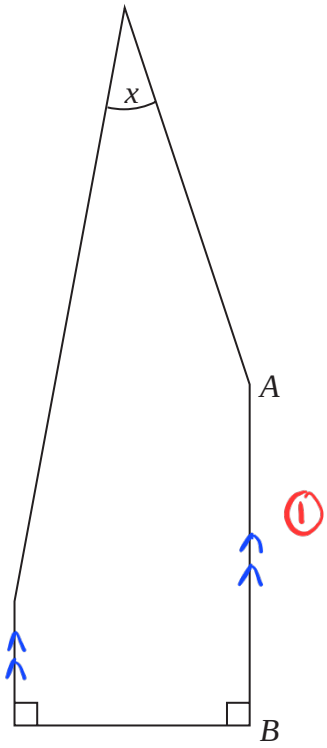
$x = \frac{180^\circ - 27^\circ}{2}$ (1)

$= 76.5^\circ$ (1)

76.5 °

(Total for Question 20 is 4 marks)

21 The diagram shows a 5-sided polygon.



(c) On the diagram, mark with arrows (≫) a pair of parallel sides.

(1)

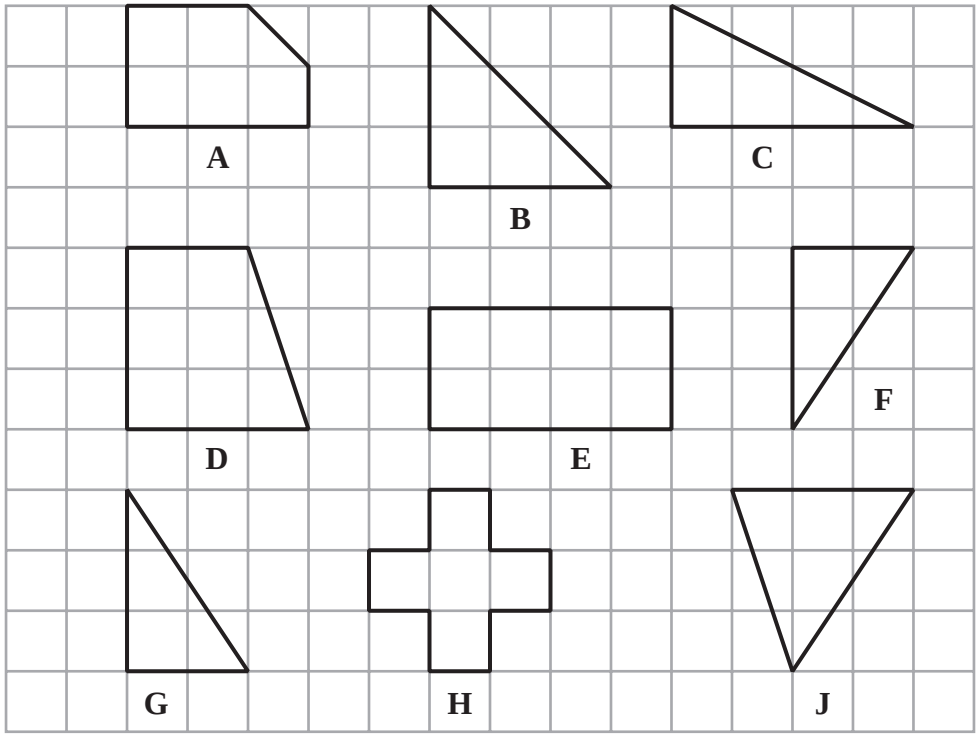
(d) Write down the mathematical name of a 5-sided polygon.

pentagon

(1)

(Total for Question 21 is 2 marks)

22 Here are nine shapes drawn on a grid of squares.



Shape **D** is a quadrilateral.

(a) What is the mathematical name of this quadrilateral?

Trapezium (1)

.....

(1)

One of the shapes is congruent to shape **G**

(b) Write down the letter of this shape.

F (1)

.....

(1)

(c) Write down the order of rotational symmetry of shape **H**

4 (1)

.....

(1)

(d) How many lines of symmetry has shape **E**?

2 (1)

.....

(1)

(Total for Question 22 is 4 marks)

23 The diagram shows a regular 10-sided polygon, *ABCDEFGHIJ*

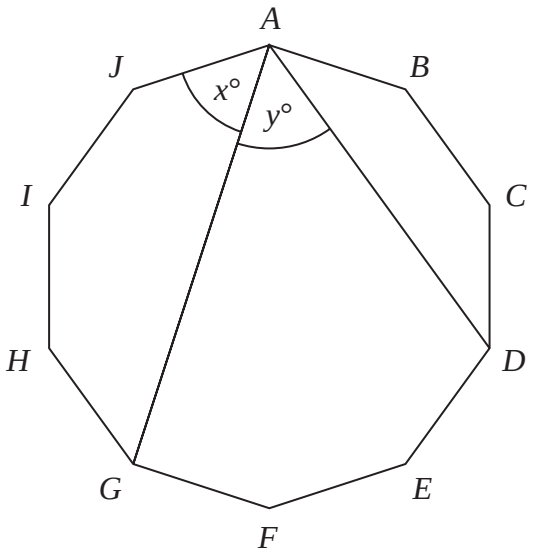


Diagram **NOT** accurately drawn

Show that $x = y$

Interior angle : $\frac{(10-2)\times 180^\circ}{10} = 144^\circ$ (1)

$x = \frac{540^\circ - 3(144^\circ)}{2} = 54^\circ$ (1)

$BAD^\circ = \frac{360^\circ - 2(144^\circ)}{2} = 36^\circ$ (1)

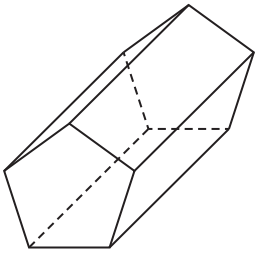
$y = 90^\circ - 36^\circ$

$= 54^\circ$ (1)

$\therefore y = x$

(Total for Question 23 is 4 marks)

24 (a) Write down the mathematical name of this 3-D shape.



Prism (1)

.....

(1)

(b) (i) How many faces does this shape have?

7 (1)

.....

(1)

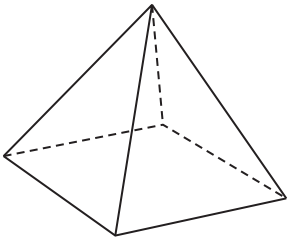
(ii) How many vertices does this shape have?

10 (1)

.....

(1)

Here is a different 3-D shape.



Marie makes a model of the shape.
She uses a length of wire to make each edge of the model.
Each edge of the model is 5 cm long.

Marie has 70 cm of wire.

(c) What length of wire does she have left after making the model?

70 - (8 x 5) (1)

= 70 - 40

= 30 (1)

30

..... cm

(2)

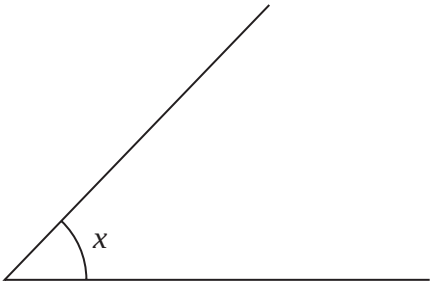
(Total for Question 24 is 5 marks)

25 (a) Write down the mathematical name for an 8-sided polygon.

Octagon (1)

.....

(1)

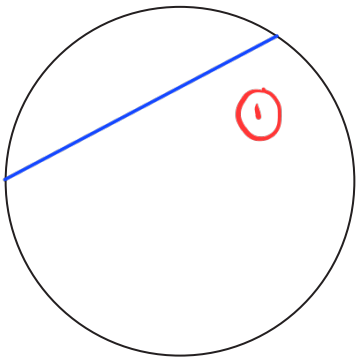


(b) What type of angle is the angle marked x?

Acute (1)

.....

(1)



(c) On the diagram above, draw a chord of the circle. (1)

(1)

(d) Change 3.6 metres into centimetres.

$3.6 \times 100 = 360$

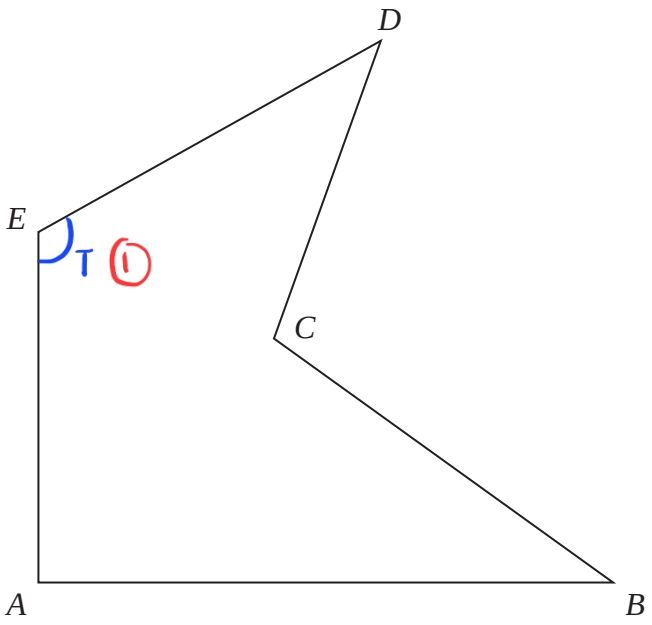
360 (1) cm

.....

(1)

(Total for Question 25 is 4 marks)

26 The diagram shows a 5-sided polygon, *ABCDE*



(a) Write down the mathematical name for a 5-sided polygon.

pentagon (1)

.....

(1)

(b) Measure the length of the line *AB*
Give your answer in centimetres.

7.6 (1) cm

.....

(1)

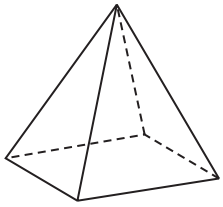
(c) On the diagram, mark an obtuse angle with the letter *T*

$90° < \theta < 180°$

(1)

(Total for Question 26 is 3 marks)

27 Here is a solid shape.



(a) Write down the number of edges of this shape.

8 (1)

.....

(1)

Here is a parallelogram.

(c) Write down the order of rotational symmetry of the parallelogram.

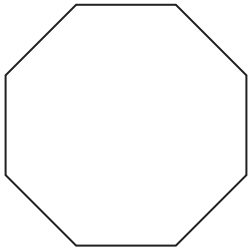
2 (1)

.....

(1)

(Total for Question 27 is 2 marks)

28 (a) Write down the mathematical name of this polygon.



octagon (1)

.....

(1)

(Total for Question 28 is 1 marks)