

# 26. [Geometry]

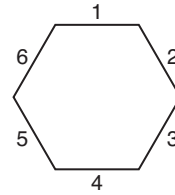
## Skill 26.1 Classifying polygons.

MM7 1 2 3 3 4 4  
MM8 1 1 2 2 3 3 4 4

Polygons are two dimensional, closed shapes with many angles, e.g. triangles have 3 angles and quadrilaterals have 4 angles. They can be described by their number of sides.

**Q.** How many sides does a hexagon have?

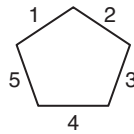
**A.** 6



According to its definition, a hexagon is a polygon with six sides. The prefix "hexa" stands for the number 6 in Greek.

**a)** How many sides does a pentagon have?

5



**b)** How many sides does an octagon have?

.....

**c)** How many interior angles are there in a square?

.....

**d)** How many interior angles are there in a nonagon?

.....

**e)** How many sides does a triangle have?

.....

**f)** How many interior angles are there in a heptagon?

.....

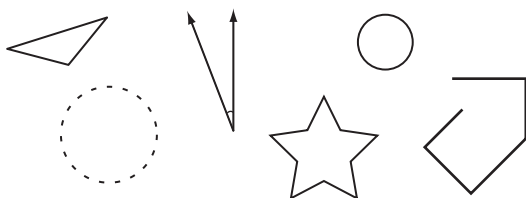
**g)** I am a plane figure with five interior angles. How am I best described?

- A) A pentagonal prism
  - B) A nonagon
  - C) A pentagon
  - D) A regular heptagon
- .....

**h)** Which of the following 2D shapes has the greatest number of sides?

- A) A regular nonagon
  - B) A regular heptagon
  - C) A heptagon
  - D) A regular decagon
- .....

**i)** Circle the polygons in the set of figures below.



**j)** Which of the following statements best describes a regular polygon?

- A) All interior angles are equal in size and all side lengths are equal
  - B) All interior angles are equal in size
  - C) All side lengths are equal
- .....

**Q.** I am a triangle with three sides of equal length. What am I?

- A) An isosceles triangle
- B) A scalene triangle
- C) A right-angled triangle
- D) An equilateral triangle

**A.** D)

According to their definitions:

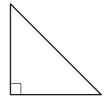
A) an isosceles triangle has two equal side lengths, so A) can't be the answer.



B) a scalene triangle has all three sides of different lengths, so B) is not the answer.



C) a right-angled triangle has an angle that measures  $90^\circ$ . The side opposite a right angle (hypotenuse) is always longer than the other two sides, so C) is not the answer.



D) an equilateral triangle has all three sides of equal length, so D) is the answer.



**a)** For the polygons below, consider the feature 'right angle'.

Which shape is the odd one out?

- A) A square
- B) A parallelogram
- C) A rectangle
- D) A right-angled triangle

**b)** Match each triangle to its best description.

- right-angled triangle
- isosceles triangle
- equilateral triangle
- scalene triangle

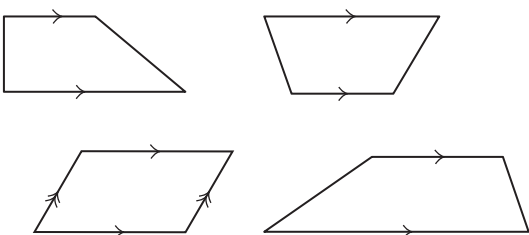
**c)** I am a plane figure with all sides of different length. What am I?

- A) An isosceles triangle
- B) An equilateral triangle
- C) A tetrahedron
- D) A scalene triangle

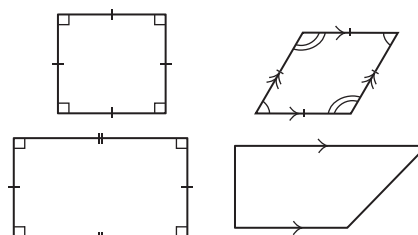
**d)** I am a polygon with all sides of equal length and opposite angles equal. What am I?

- A) A trapezium
- B) An equilateral triangle
- C) A rhombus
- D) A kite

**e)** Circle the shape that is **not** a trapezium.



**f)** Circle the shape that is **not** a parallelogram.



When drawing lines and polygons remember to mark:

Right angles with a corner.

Equal angles with a curved line (the second pair of equal angles takes on a pair of curved lines).

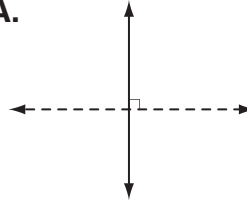
Equal lines with a dash (the second pair of equal lines takes on a pair of dashes).

Parallel lines with an arrow (the second pair of parallel lines take on a second pair of arrows).

**Q.** Draw a line perpendicular to the vertical line shown.



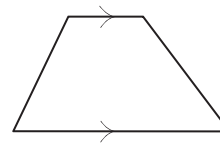
**A.**



The perpendicular line must be at a right angle to the vertical line. The right angle is marked with a corner.

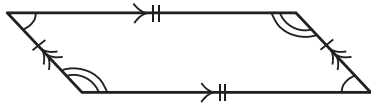
**Q.** Draw a trapezium showing the pair of parallel sides.

**A.**



A trapezium has a pair of opposite sides that are parallel.

**a)** Draw a parallelogram showing all equal angles and equal sides.



A parallelogram has opposite sides of equal length and parallel, and opposite angles equal.

**b)** Draw a pair of parallel lines.

**c)** Draw a regular hexagon showing all equal angles and equal sides.

**d)** Draw a right-angled triangle.

**e)** Draw a scalene triangle.

**f)** Draw a square showing all equal angles and equal sides.

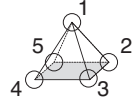
**g)** Draw a kite showing all equal angles and equal sides.

**h)** Draw a rhombus showing all equal angles and equal sides.

Polyhedra are three dimensional, solid shapes with many faces, e.g. prisms and pyramids. They can be described by the shape of their faces and/or the number of faces, edges and vertices.

**Q.** How many vertices does a rectangular pyramid have?

**A.** 5



Count the number of vertices or corners.

**Q.** How many faces does a pentagonal prism have?

**A.** 7



OR



Count the number of faces or flat surfaces.

**a)** How many edges does a tetrahedron have?

8

**b)** How many faces does a hexagonal prism have?

**c)** Of the 4 faces on a triangular pyramid how many are triangles?

**d)** Of the 6 faces on a pentagonal pyramid how many are triangles?

**e)** Name the solid that has 8 faces which are all equilateral triangles.

**f)** How many more edges does a triangular prism have than a triangular pyramid?

**g)** Name the solid that has 6 faces which are all squares.

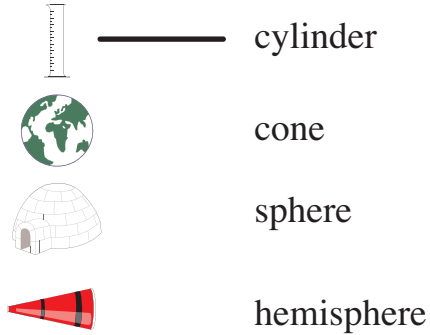
**h)** What more common name also describes a hexahedron?

**i)** How many more vertices does a pentagonal prism have than a pentagonal pyramid?

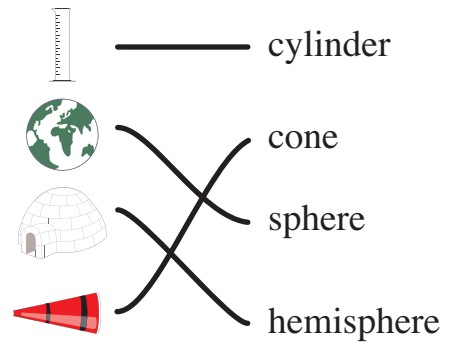
**j)** Of the 8 faces on a hexagonal prism how many are rectangles?

Some three dimensional shapes have a curved face, e.g. cylinders, cones, spheres and hemispheres.

**Q.** Match each diagram to its best description.



**A.**



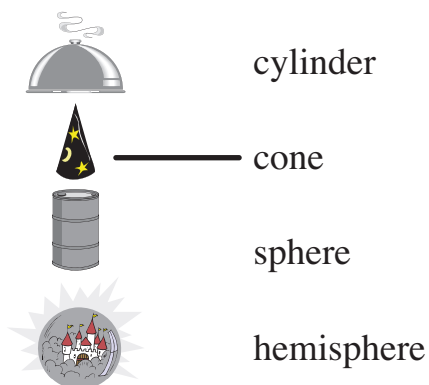
**a)** Draw a 3D representation of a sphere.

**b)** Draw a 3D representation of a cylinder.

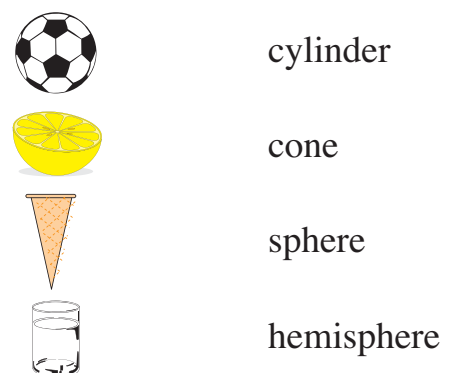
**c)** Draw a 3D representation of a cone.

**d)** Draw a 3D representation of a hemisphere.

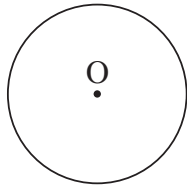
**e)** Match each diagram to its best description.



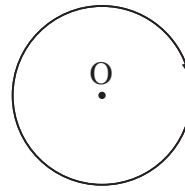
**f)** Match each diagram to its best description.



**Q.** Draw a line to show the circumference of this circle.

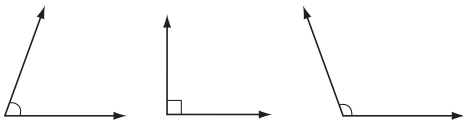


**A.**

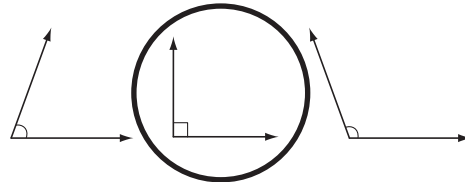


The circumference is the distance around a circle.

**Q.** Circle the right angle.

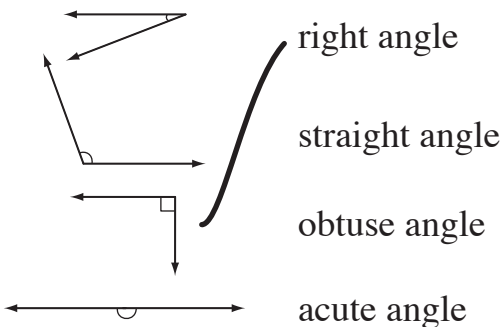


**A.**

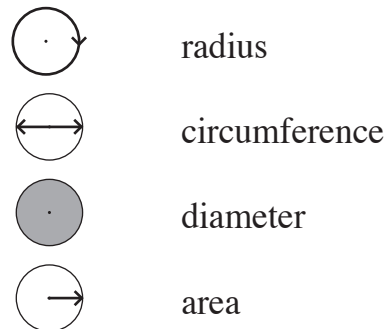


A right angle measures  $90^\circ$  and is marked with a corner.

**a)** Match each angle to its best description.



**b)** Match each diagram to the most appropriate term.



**c)** Name the line that joins the centre to any point on the circle.

- A) Circumference
- B) Radius
- C) Diameter
- D) Perimeter

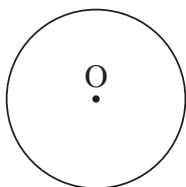
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**d)** Name the line that passes through the centre of a circle and has both endpoints on the circle.

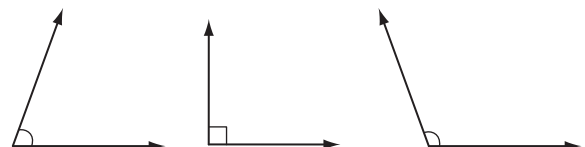
- A) Circumference
- B) Radius
- C) Diameter
- D) Perimeter

.....

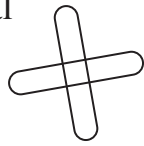
**e)** Draw a line to show the radius of this circle.



**f)** Circle the obtuse angle.



Q. Does the shape have vertical, horizontal or rotational symmetry?



A. **Rotational symmetry** The shape has rotational symmetry because a rotation of  $90^\circ$  and  $180^\circ$  produces an image that fits exactly on the original shape.

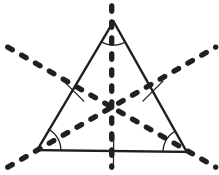
Q. Which of the letters below show vertical symmetry?

A C W Z M

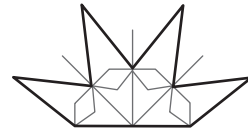
A. **A, W, M** The axes of symmetry must go up and down the page. The letter must have a mirror image at that line.

a) How many axes of symmetry does an equilateral triangle have?

3



b) Does the shape have vertical, horizontal or rotational symmetry?



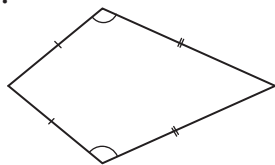
c) Which of the letters below show vertical symmetry?

N H Z V Y E

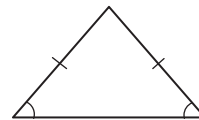
d) Does the shape have vertical, horizontal or rotational symmetry?



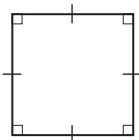
e) Draw any lines of symmetry through the kite below.



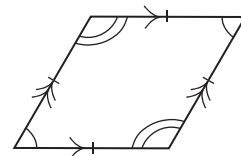
f) Draw any lines of symmetry through the isosceles triangle shown below.



g) How many axes of symmetry does a square have?



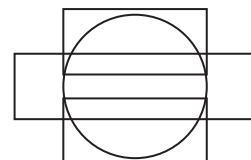
h) How many axes of symmetry does the rhombus have?



i) Which of the letters below show horizontal symmetry?

A C W Z M D

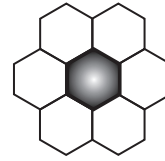
j) Draw any lines of symmetry through the shape below.



**Q.** Can a regular hexagon be tessellated?



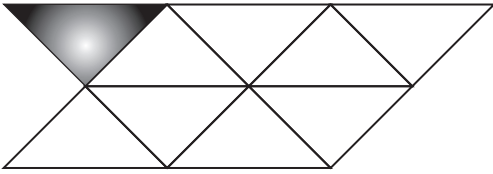
**A.** Yes



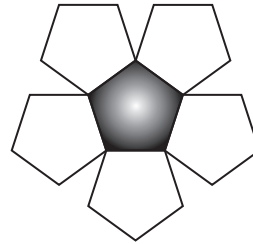
When the shape is repeated, it completely fills an area.

**a)** Can the triangle below be tessellated?

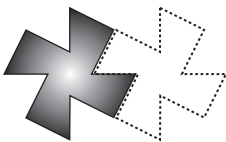
Yes



**b)** Can the pentagon below be tessellated?



**c)** *Maurits Escher* developed tessellating patterns and artwork by adding and taking space from the opposite sides of polygons. Does the following shape tessellate?



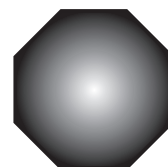
**d)** Can a circle be tessellated?



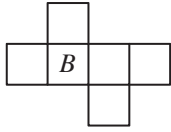
**e)** Can a parallelogram be tessellated?



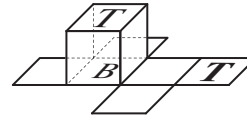
**f)** Can a regular octagon be tessellated?



**Q.** On this net of a hexahedron (cube) the base **B** is marked. Label the top face with a **T**.



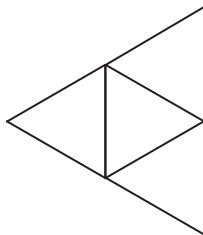
**A.**



Enlarge, trace and cut out the shape, folding to form a cube.

**a)** Name the 3-dimensional shape that could be formed from the net below.

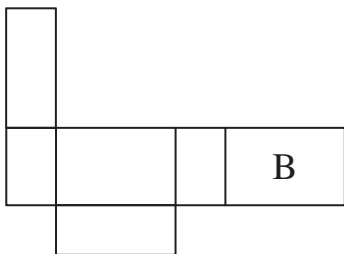
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**b)** My net is made up of 1 pentagon and 5 triangles. I am a 3-dimensional shape. What am I?

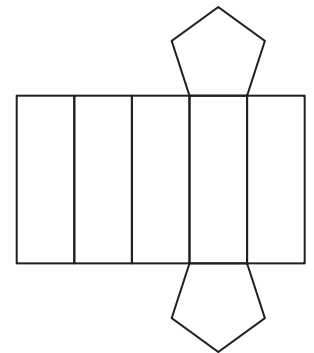
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**c)** On this net of a rectangular prism the base **B** is marked. Label the top face with a **T**.

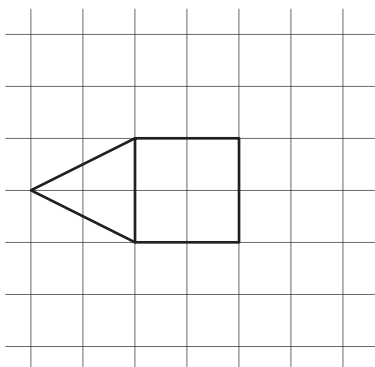


**d)** Name the 3-dimensional shape that could be formed from the net below.

.....



**e)** Use the grid below to complete this net to form a square pyramid.



**f)** Name the 3-dimensional shape that could be formed from the net below.

.....

