virtual au pair

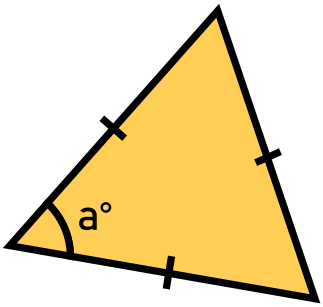
GR.6 Maths

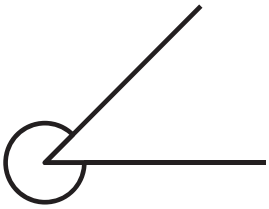
term 3 ATP 2025

topics

- length
- 2D shapes
- 3D figures
- transformasions en symmetry
- perimeter, area and volume

TIME TO STUDY





question 1 : length

1.1) Complete the table.

Cm	m	km
		12,34
	5 550	
12 000		
	240	
	2 500 $\frac{1}{4}$	

1.2) Answer the following questions.

a) How many meters are there in 12,5km ? _____

b) How many cm are there in $60\frac{1}{2}$ m ? _____

c) How many km are there in 3550m ? _____

d) How many mm are there in 3250cm ? _____

e) How many cm are there in 650mm ? _____

f) How many meters are there in $12\frac{3}{4}$ km ? _____

g) How many cm are there in $\frac{1}{2}$m ? _____

1.3) Conversion

a) 32 560m = _____km and _____m

b) 7 250cm = _____m and _____cm

c) 895mm = _____cm and _____mm

d) 22,65km = _____m

e) 5,25m = _____cm

f) 3,85km = _____m

g) 45,5cm = _____mm

h) $11\frac{1}{2}$ km = _____m

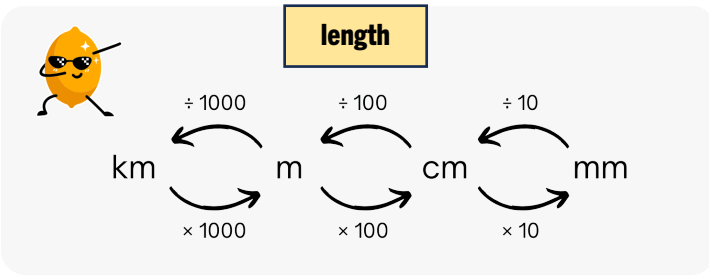
i) $25\frac{1}{4}$ m = _____cm

j) $\frac{3}{4}$ km = _____m

k) 2500m = _____km

l) 590cm = _____m

m) 9600m = _____km



1.4) Complete the following:

a) 750 cm × 18 = _____ m

b) 2,500,000 cm ÷ 50 = _____m = _____cm

c) 3.5 km $-3\ 184$ m = _____m $-3\ 184$ m = _____m

d) 318 m + 496 m + 45600 cm = _____m = _____km

1.5) Arrange the length from shortest to longest.

a) 7,72 km; 7,27 km; 7 702 m: _____

1.6) You have 21 350 cm , how many meters do you need to have 500m in total?

_____

_____

1.7) If one lap around the school is 850m, how many km will you jog if you jog around the school 12 times?

_____

_____

_____

1.8) The carpet's dimensions are 1770 cm by 3560cm . What will the dimensions in meters be ?

_____

1.9) Mias rides his bike to his friend's house every day. He drives 840m there. How many km will Mias drive in a school week if he drives to his friend and back every day?

_____

_____

_____

_____

1.10) Mom has a vegetable garden. The length is 620cm and the width is 395cm

She wants to put fence around the vegetable garden, but the wire is purchased by the meter. She also wants to keep space for an 80cm gate. How many meters of wire is she going to need?

_____

_____

_____

_____

_____

1.11) Johan must buy 65,55m of wire for his sheep pen at R62 per metre. What is the wire going to cost him?

_____

_____

_____

_____

1.12) Marna trots $\frac{3}{5}$ of 4km with her horse. How far did she trot with him?

_____

_____

_____

1.13) Liam has to dig $\frac{2}{6}$ of a 3km ditch. How far is he going to have to dig?

_____

_____

_____

_____

1.14) Five ropes individually measure 12,35m ; 6540cm; 250cm; 325cm ; 1,25m

How long are all five ropes collectively in meters?

_____

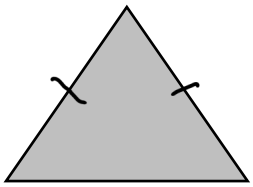
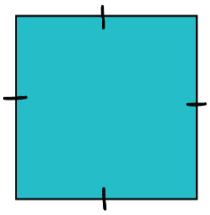
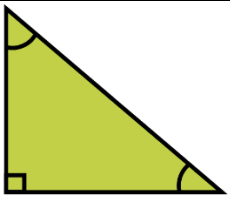
_____

_____

_____

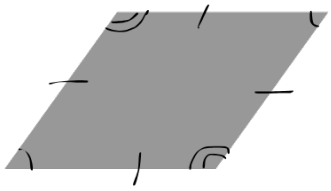
question 2 : 2D and 3D

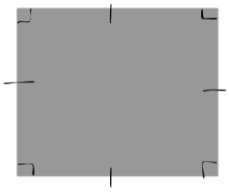
2.1) Complete the table

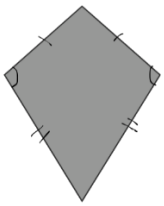
shape	name	number of straight sides	number of curved sides	angles (also type)
				
				
				
				

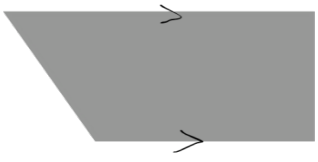
2.2) Label the shape and describe the characteristics indicated.

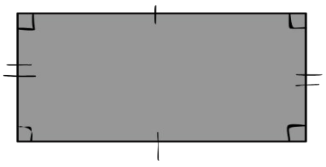
a) 

b) 

(c) 

(d) 

(e) 

(f) 

2.3) Name two similarities between a rectangle and a parallelogram.

_____

_____

_____

2.4) Discuss one difference between a rhombus and a square.

_____

_____

2.5) **Are the following statements true or false?**

a) A circle is a polygon. _____

b) A right angle is a half rotation . _____

c) A parallelogram is also a rectangle . _____

d) A rectangle is also a parallelogram. _____

e) A triangle can have two obtuse angles. _____

2.6) Name three quadrilaterals that have two acute interior angles and two obtuse interior angles. _____

2.7) Draw a circle with a diameter of 5cm in the block below.

Quess I'm sticking around

2.8) What is the difference between a circle and an oval ?

_____

2.9) Give the Mathematical names for the following:

a polygon with 5 straight sides	
a polygon with 6 straight sides	
a polygon with 7 straight sides	
a polygon with 8 straight sides	
a polygon with 9 straight sides	
a polygon with 10 straight sides	

2.10) Give the definition for each of the following.

(a) polygon: _____

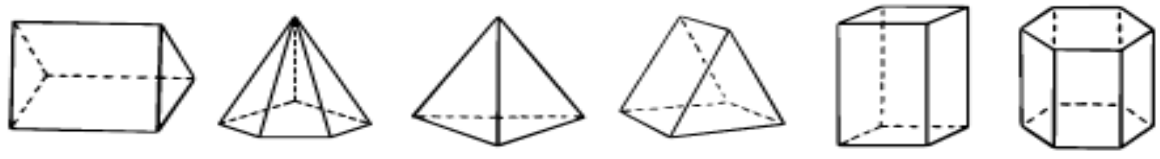
b) regular polygon: _____

(c) three-dimensional figure: _____

e) a reflex angle: _____

f) irregular pentagon: _____

2.11) Mark all the prisms with a cross.

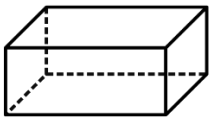
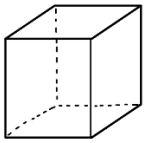
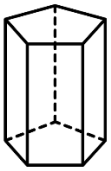
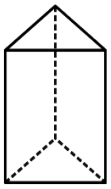
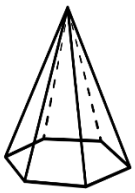
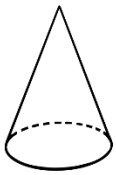
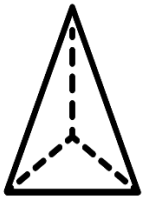


2.12) Explain the difference between a pyramid and a prism.

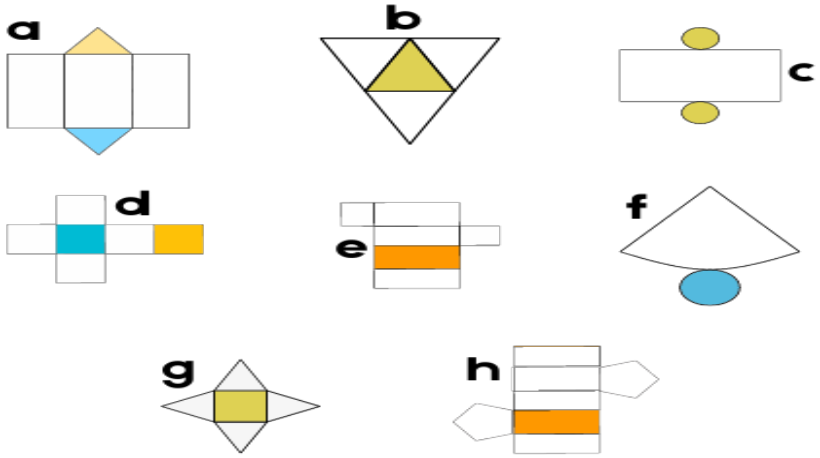
_____

_____

2.13) Label each figure and complete the table. Give total flat planes, what is the base and what type of flat planes.

figure	name	name the base and the other flat planes	vertices	edges
				
				
				
				
				
				
				

2.14) Identify the 3D figure represented by each net.



a) _____ b) _____

(c) _____ (d) _____

(e) _____ (f) _____

(g) _____ h) _____

2.15) Complete the table

Figures	**differences**	**similarities**
A and B		
B and G		

2.16) What is the difference and similarity between a rectangular prism and a cube?

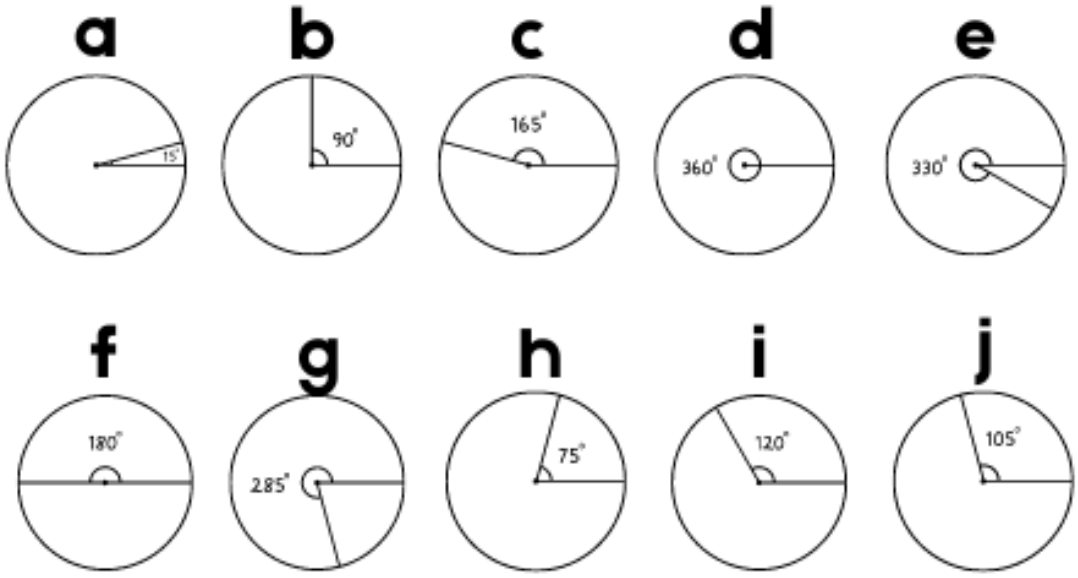
_____

_____

2.17) What would you call a figure made up of two heptagons and seven rectangles?

_____

2.18) **Label each kind of angle according to the size.**



a) _____ b) _____

(c) _____ (d) _____

(e) _____ (f) _____

(g) _____ h) _____

(i) _____ (j) _____

2.19) What is a triangle that has one right angle called? _____

2.20) What is a triangle called that has one obtuse angle?_____

2.21) **Complete the following.**

a) The only three-dimensional object with one vertex is a _____

b) The only three-dimensional object of which all the planes are square is a _____.

b) A tetrahedron is a _____ pyramid.

c) A tetrahedron has_____ sides, _____ faces, and _____ apexes.

d) Each plane of a tetrahedron has a maximum of ____ lines of symmetry. The order of symmetry of each plane of a tetrahedron is at most _____

question 3 : transformations

3.1) Label the transformations:

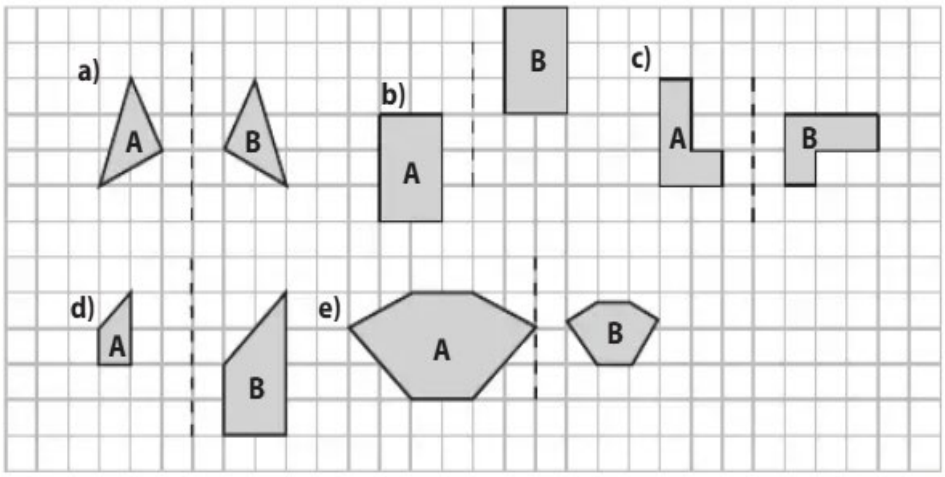
a) _____

b) _____

c) _____

d) _____

e) _____



3.2) What transformation will have a mirror image as result? _____

3.3) If the length of a triangle's sides is 3; 4 and 2 and after the transformation it is 9; 12 and 6. By what scale factor was the triangle enlarged?

_____

3.4) What transformations occur when a shape has a mirror image and moves downwards? _____

3.5) **Look at the graphs on the next page and do the following: Draw the new triangle on the graph.**

a) Graph A : Translate the triangle by two places to the right and three places down.

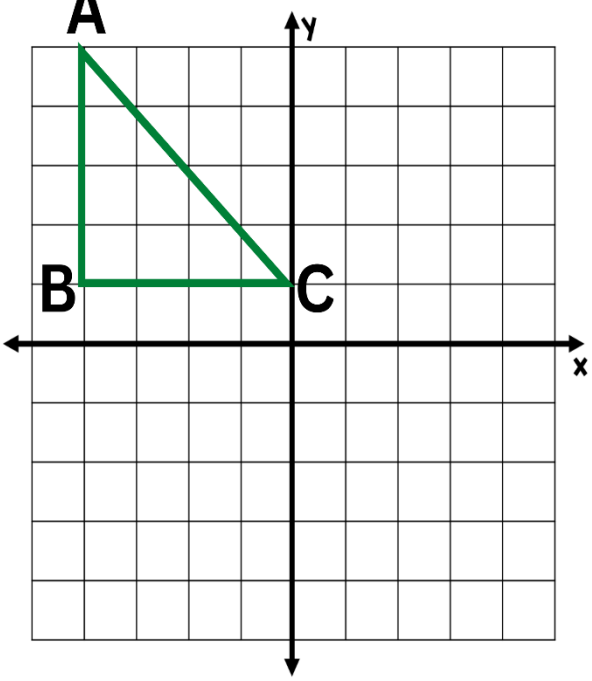
b) Graph B : Draw the reflection to the bottom

c) Graph C : Reflect to the right

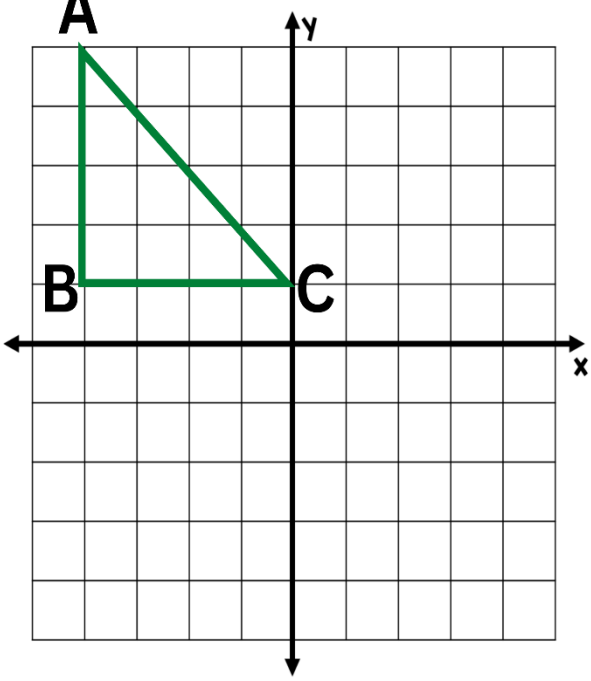
d)Graph D : Rotate the triangle 180°

Dont' let this blow your mind.

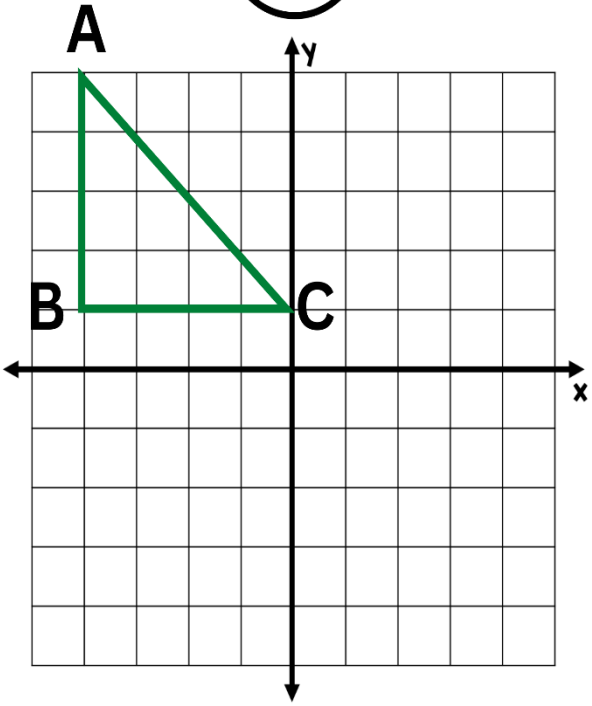
A



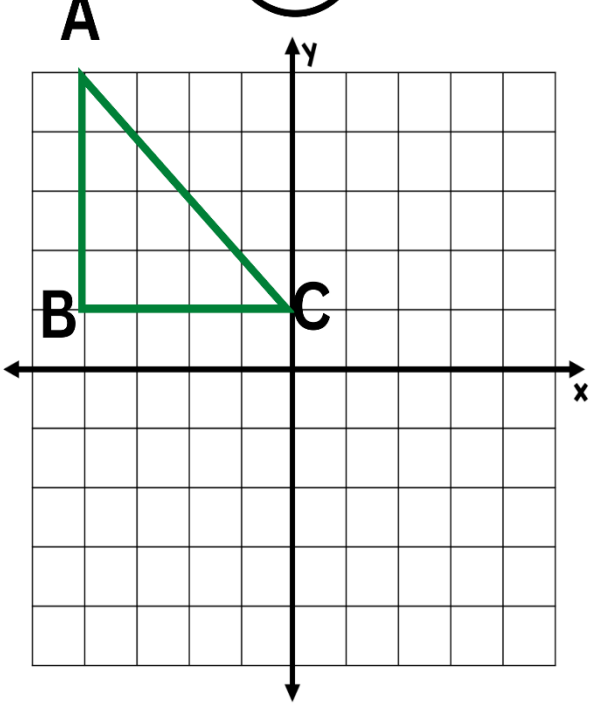
B



C



D



3.6) **On the chart paper at the bottom, follow the following instructions.**

a) Write the coordinates of each vertex in the table. The axis counts in 1 cm's .

b) Increase quadrilateral ABCD by a factor of 3 – write the new coordinates in the table.

c) Decrease triangle ABC by factor 2 – write the new coordinates in the table.

Form	**Quadrilateral**				**Triangle**		
before transformation	A	B	C	D	A	B	C
after transformation	A'	B'	C'	D'	A'	B'	C'

d) Record the two new shapes on the graphs.

e) Compare the area of quadrilateral ABCD before and after the transformation.

_____

_____

_____

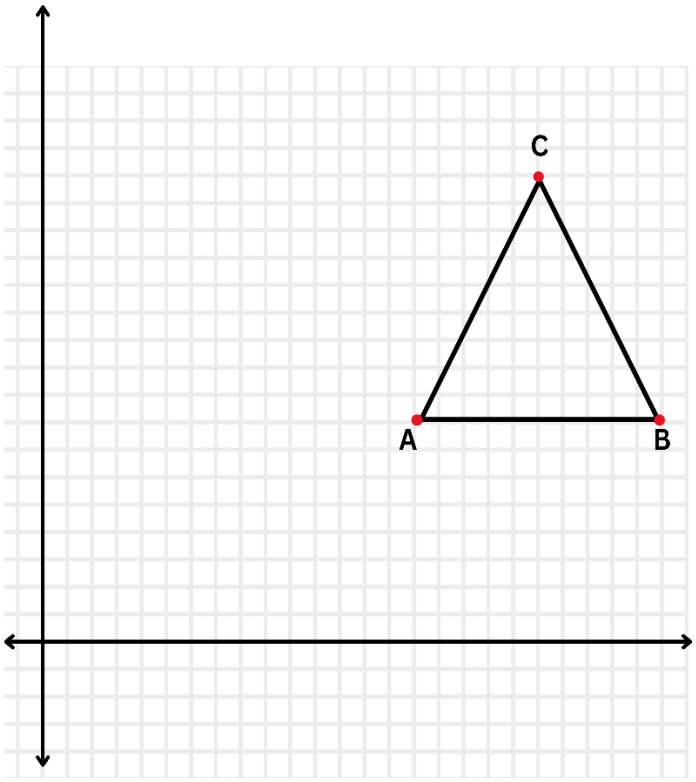
_____

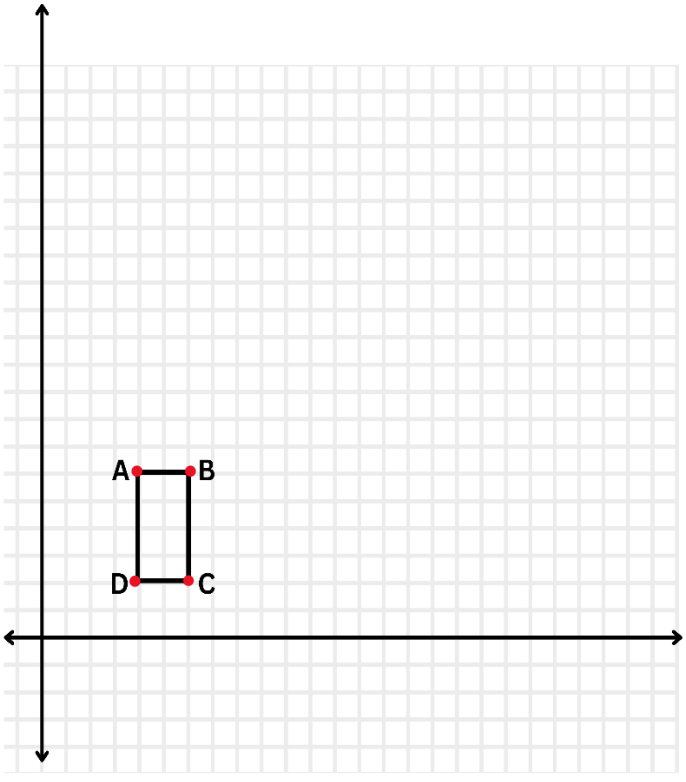
f) Compare the side lengths of the triangle before and after the transformation.

_____

_____

_____





question 4 : symmetry

4.1 Which 2D shape has many lines of symmetry ?

_____

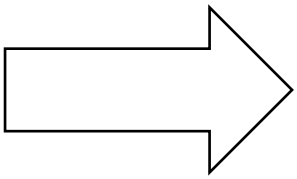
4.2 How many lines of symmetry will a square have?

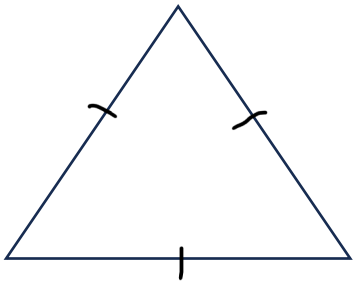
_____

4.3 Which of the following has no line of symmetry ?

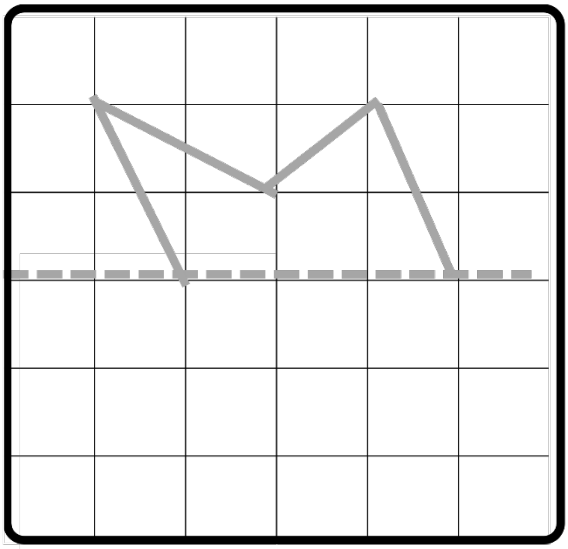
isosceles trapezoid	parallelogram	rectangle

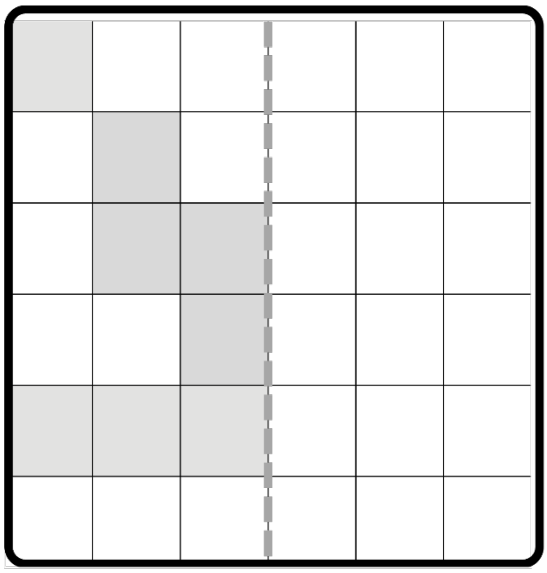
4.4) **Draw the lines of symmetry for each shape.**





4.5) **Complete the mirror images.**





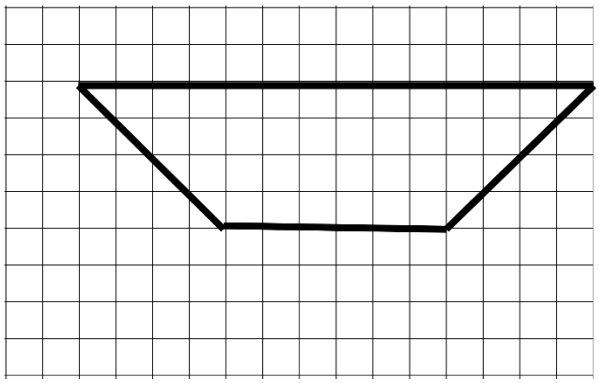
4.6) **Complete the table.**

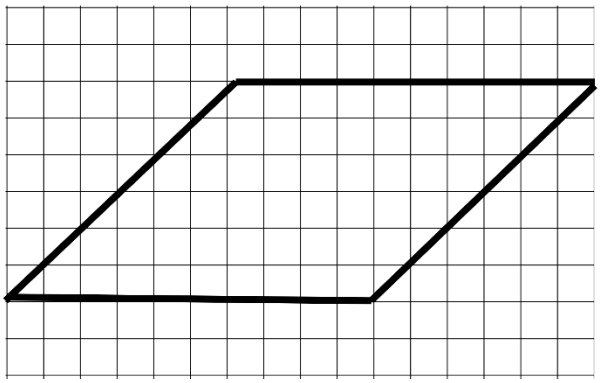
shape	equilateral triangle	kite	rhombus	circle	irregular quadrilateral
Order of rotational symmetry					

Order of rotation symmetry : In a 360 degree rotation - in other words the 4 turns that the shape makes when it rotates, how many times will it be in the exact same position again to fit into the original shape?

question 5 : circumference, area and volume

5.1) Determine the circumference and area – assume each block line is equal to 10mm.

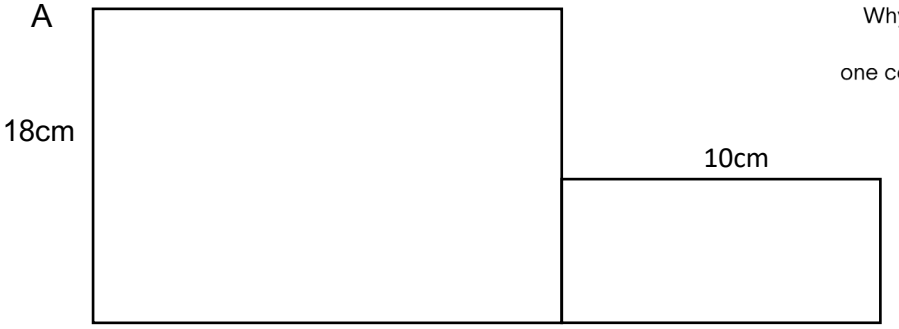




5.2) Now classify shapes A and B.

5.3) Determine the perimeter and area of the following:

A



Why are area and perimeter such good friends?
They are the same shape,
one covers it up, while the other keeps it in line!

5.4) A rectangular prism has a base of 12m by 9m and is 5m high. What is the volume of the prism in cm ?

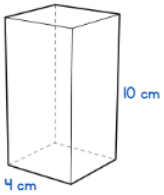
5.5) What would be the circumference of an equilateral triangle with one side 55mm?

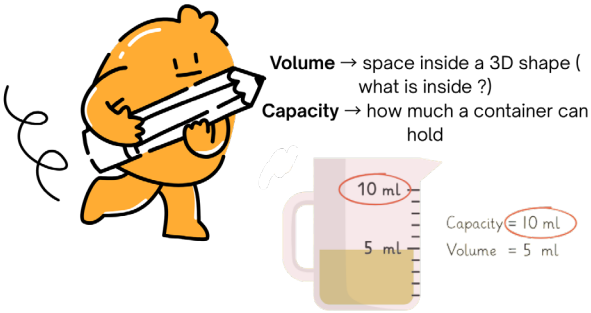
_____

What would be the circumference of a regular hexagon with a side length of 6m?

_____

5.6) Determine the volume of the container. If 40% of the volume is tapped then, what will remain? The prism has a square as its base.





_____

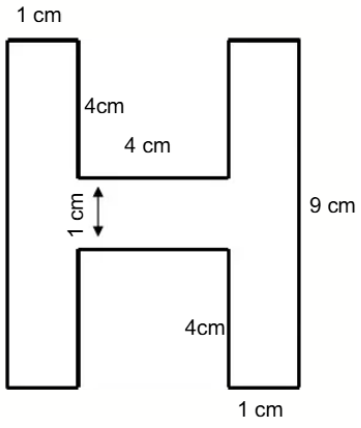
_____

_____

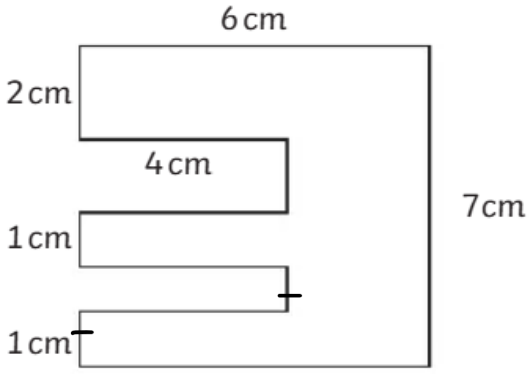
_____

5.7) Determine the perimeter of the composite shapes.

a)



b)



_____ _____

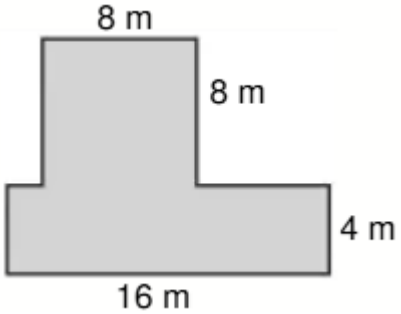
_____ _____

_____ _____

_____ _____

5.8) Calculate the area of the composite shapes.

a)



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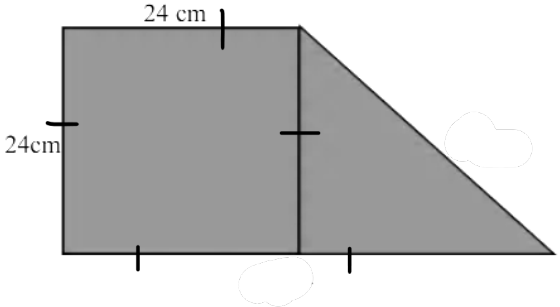
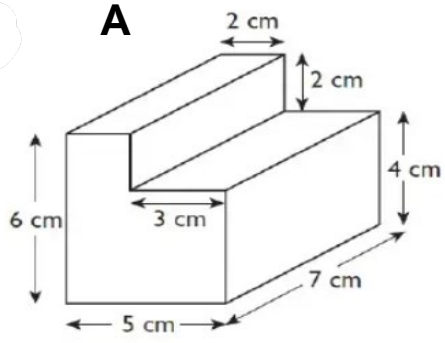
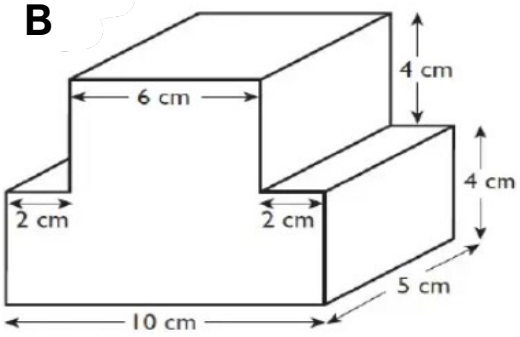


5.9) Calculate the volume of the figures.

A

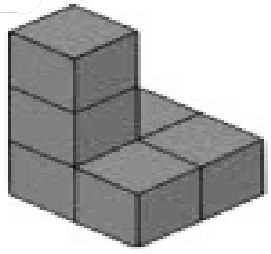


B

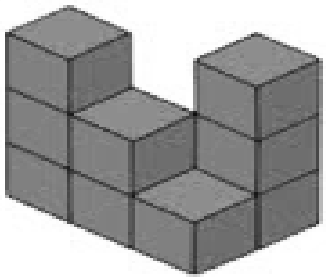


5.10) Assume each side length is 1cm. What is the volume of each of the following?

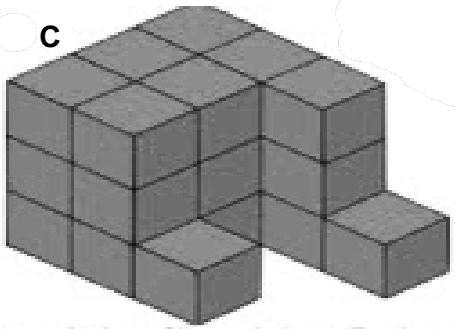
A



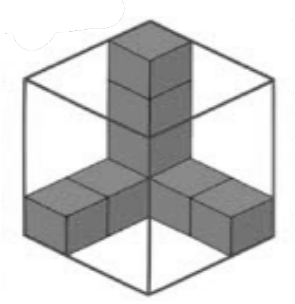
B



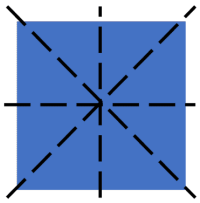
C



5.11) What is the volume and capacity of the figure below ?

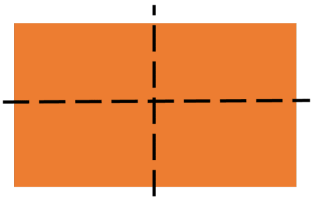


order of rotational symmetry



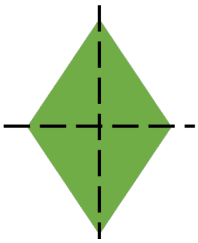
square

order of symmetry : 4



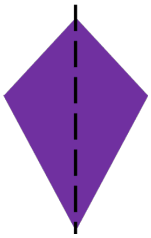
rectangle

order of symmetry : 2



rhombus

order of symmetry : 2

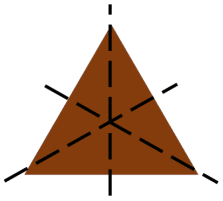


kite

order of symmetry : 1

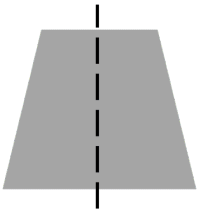
parallelogram

order of symmetry : 2



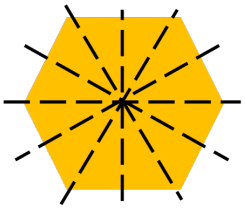
equilateral triangle

order of symmetry : 3



isosceles trapezoidal

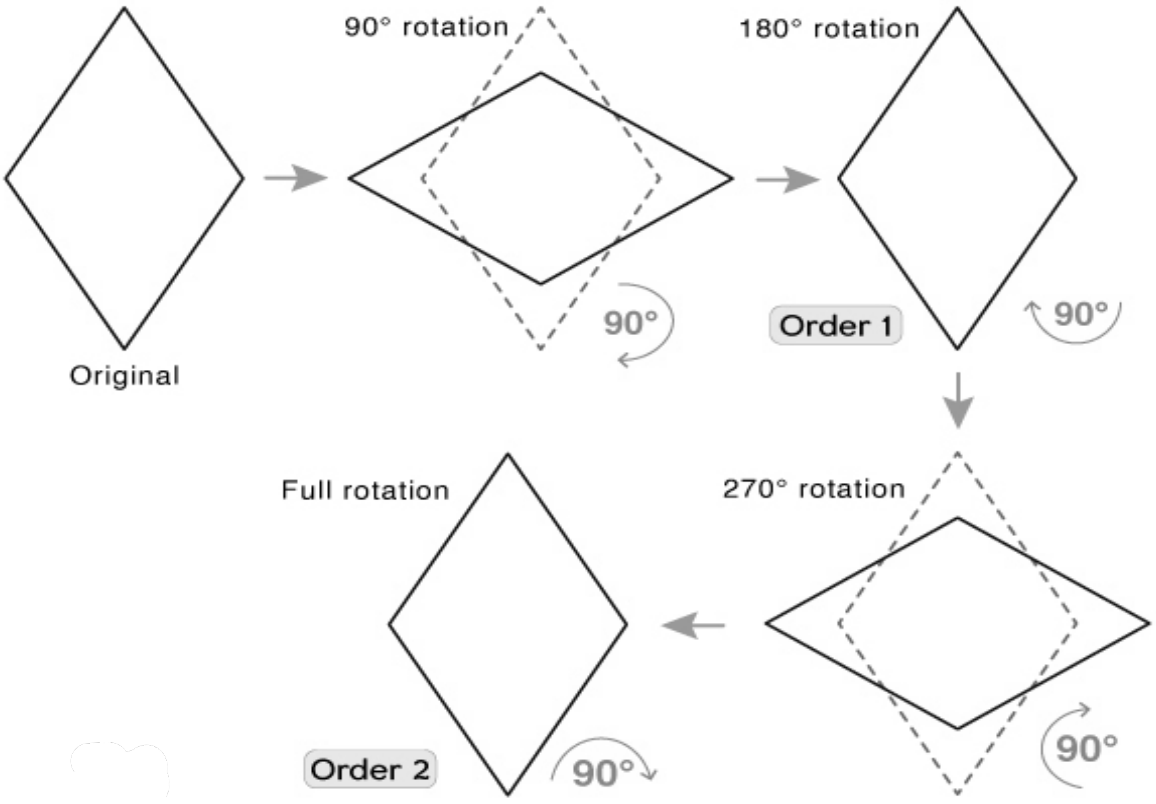
order of symmetry : 1



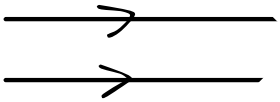
hexagon

order of symmetry : 6

- How many times in a 360 degree turn does it look like the original one again?
- Each shape can only have 4 rotations, every 90 degrees, a diamond looks identical again every second rotation and then has 2 orders of rotation symmetry.



TYPES OF LINES



line segment

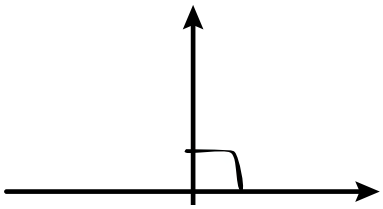
line with a definite starting point and ending point

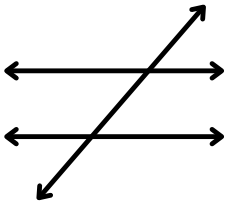
ray

has a definite starting point but no def. endpoint

parallel lines

never cross; everywhere same/constant distance from each other





perpendicular lines

intersecting lines that meet at a 90 degree angle

tansversal

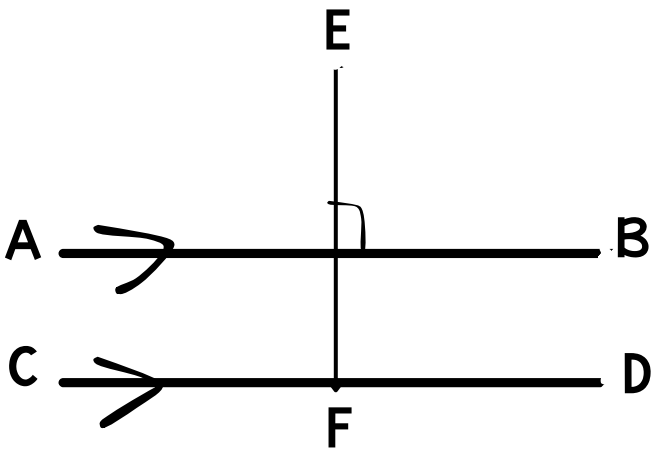
A lines that cuts across two or more lines

symbols

⊥ perpendicular

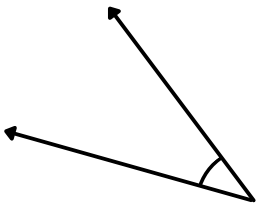
|| parallel

A line is named in alphabetic order .



AB is parallel to CD
EF is perpendicular to AB
EF is perpendicular to CD

TYPES OF ANGLES

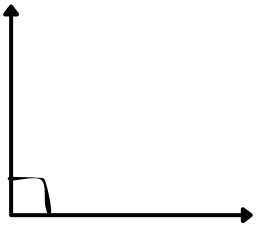


acute angle

greater than 0° and less than 90°

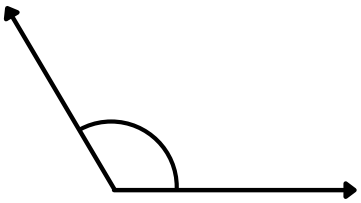
straight angle

exactly 180° (straight line)



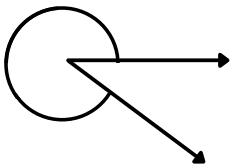
right angle

exactly 90° (indicated by a square)



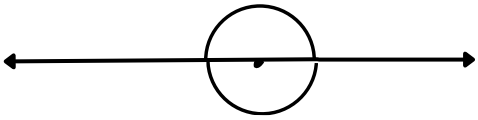
obtuse angle

greater than 90° and less than 180°



reflex angle

greater than 180° and less than 360°

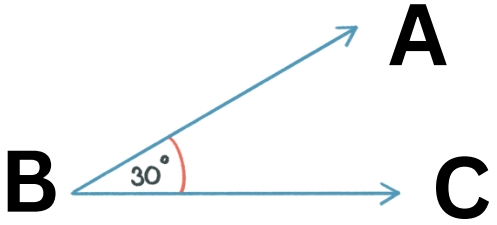


rotation/ full angle

exactly 360°

- Angles are measured in degrees (°)
- Angle sizes are measured with a protractor.
- A right angle is indicated by a box.
- When 2 straight lines meet/intersect, an angle is formed.

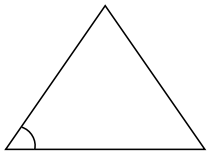
$A\hat{B}C$



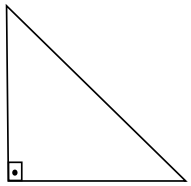
TRIANGLES

ATTENTION: angles are indicated with arcs and sides with dashes.
angles in degrees and sides (long) in units of length such as cm/mm/m

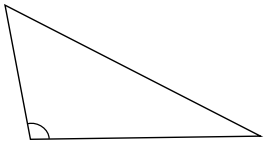
1 classify by angles



acute triangle
All the angles are less than 90 degrees

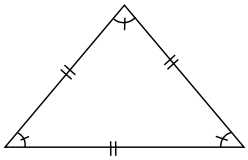


right-triangle ■
One angle is exactly 90 degrees

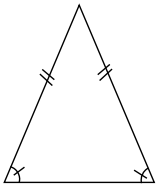


obtuse triangle
one angle is greater than 90 degrees.

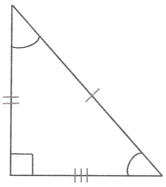
2 classify by sides



equilateral triangle
All three sides are exactly the same length, so all three angles will also be the same size.

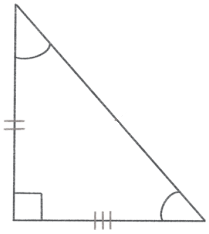


isosceles triangle
Two sides are the same length and consequently the 2 angles will also be the same size.



scalene triangle
No sides are the same length ; no angles are the same size

3 classify by sides and angles

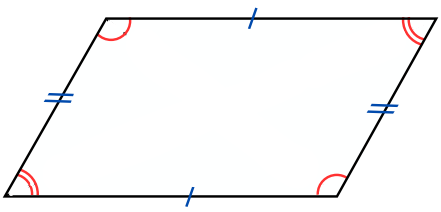


right isosceles triangle

SUM OF 3 INTERIOR ANGLES OF ANY TRIANGLE IS 180°

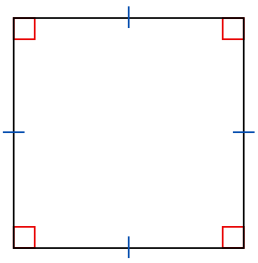
TYPES OF QUADRILATERALS

A quadrilateral is any polygon with 4 straight sides



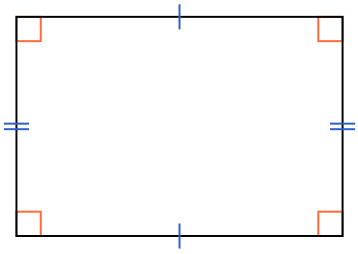
parallelogram

2 pairs of opposite sides parallel
2 pairs of opposite sides of equal length
opposite angles equal
2 acute angles; 2 obtuse angles
sum of 4 interior angles is 360°



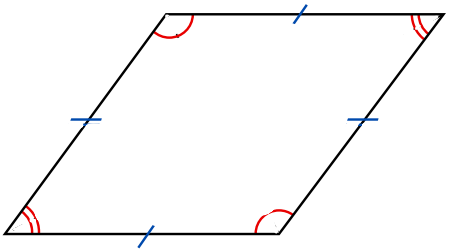
square

four sides of equal length
four angles equal (4 right angles)
2 pairs of opposite sides parallel
sum of 4 interior angles is 360°



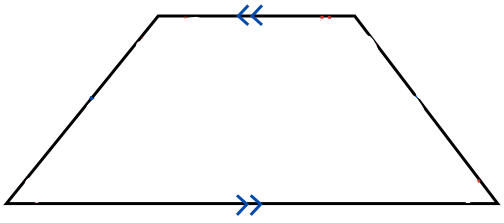
rectangle

2 pairs of opposite sides parallel
2 pairs of opposite sides of equal length
4 angles equal in size (4 right angles)
sum of 4 interior angles is 360°



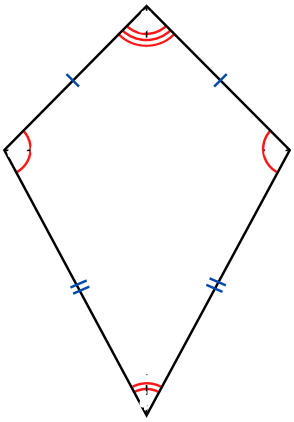
rhombus

four sides of equal length
2 pairs opposite angles equal
2 acute angles; 2 obtuse angles
2 pairs of opposite sides parallel
sum of 4 interior angles is 360°



trapezium/trapezoid

one pair of opposite sides parallel
sum of 4 interior angles is 360°



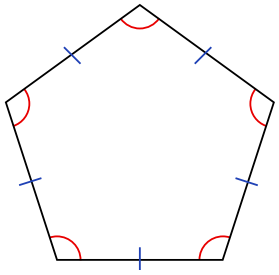
kite

2 pairs of adjacent sides of equal length
1 pair of opposite angles of equal size
sum of 4 interior angles is 360°

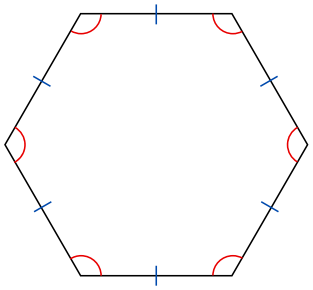
SUM OF 4 INTERIOR ANGLES OF ANY QUADRILATERAL IS 360°

OTHER POLYGONS

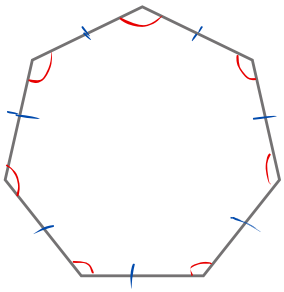
A polygon is any closed 2-D shape with only straight sides
regular : sides are of equal length
irregular : sides not of equal length
Look at the regular polygons



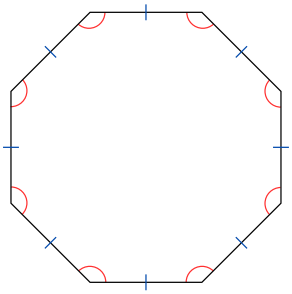
regular pentagon
5 sides of equal length
5 angles equal in size



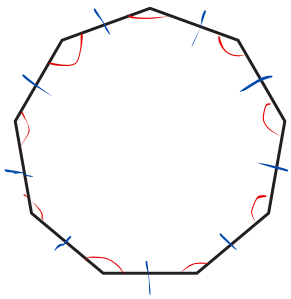
regular hexagon
6 sides of equal length
6 angles equal in size



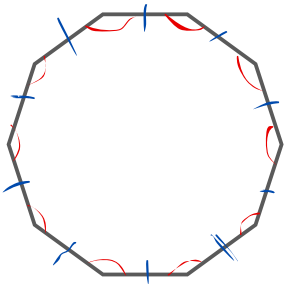
regular heptagon
7 sides of equal length
7 angles equal in size



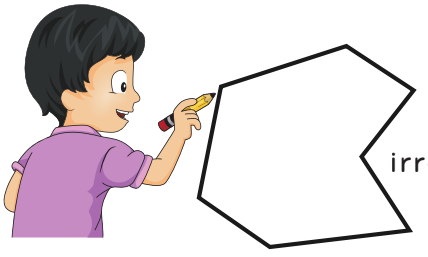
regular octagon
8 sides of equal length
8 angles equal in size



regular nonagon
9 sides of equal length
9 equal angles



regular decagon
10 side equal length
10 angles equal



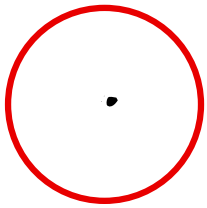
irregular heptagon

If it is not indicated that the sides are all equal; it cannot be classified as a regular shape for example a pentagon with no markings **= pentagon** (not regular pentagon)

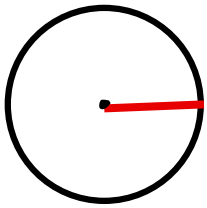
PARTS OF A CIRCLE

A circle is a 2-D shape with one curved side and no angles – it's not a polygon

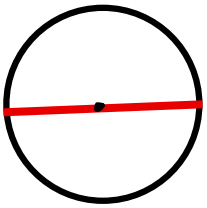
circumference : distance around the circle (perimeter)



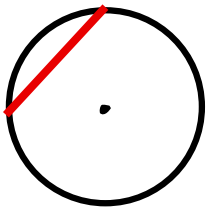
radius : distance from the center to the edge/circumference (half diameter)



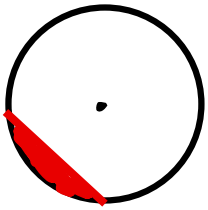
diameter : a straight line extending through the center from edge to edge (two radii together)



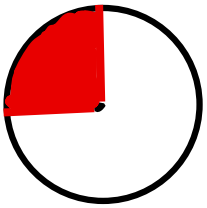
chord : a straight line that touches any 2 places of the circumference without passing through the middle



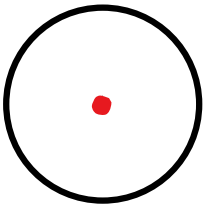
segment: area between a chord and the circumference

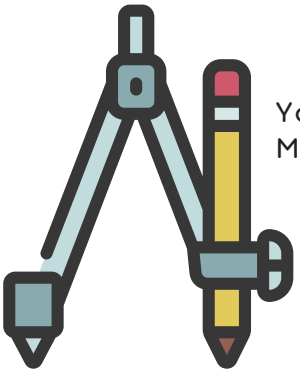


sector : area between two radii and the circumference



center : radius is the same everywhere from the center





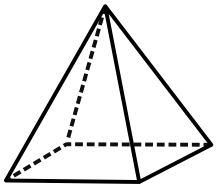
You use a compass and pencil to draw a circle.
Measure the radius on your ruler and draw your circle

3-D FIGURES

- All flat faces of 3-D figures are polygons
- 3-D figures are classified by their EDGES, VERTICES, and PLANES
- There are three types of 3-D figures:

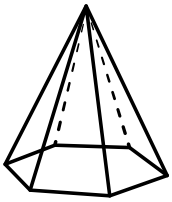
1. **prisms:** Have two identical bases which is connected by rectangles – it is named according to the base
2. **pyramids**: have a base and then triangles that meet at one point/vertice. Also named after the base.
3. **cylinders** : Two parallel, congruent (equal) circular bases & a curved surface that connects the bases

PYRAMIDS



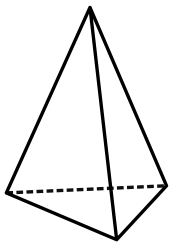
square pyramid

- square base
- 5 flat surfaces : 1 square and 4 triangles
- 5 vertices
- 8 edges



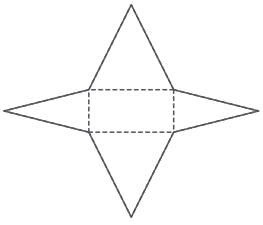
hexagonal (hexagonal) pyramid

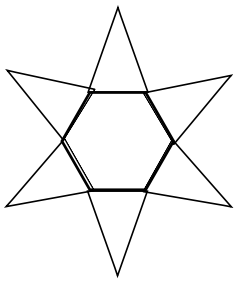
- hexagon base
- 7 flat surfaces: 1 hexagon and 6 triangles
- 7 vertices
- 12 edges

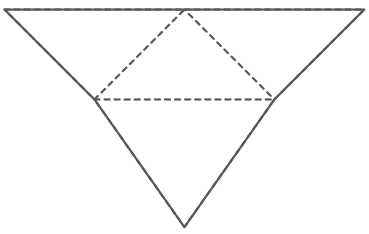


triangular pyramid

- triangle base
- 4 flat surfaces : 1 triangle and 3 triangles
- 4 vertices
- 6 edges



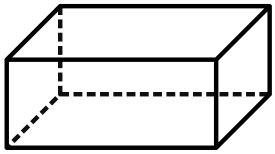




- An octagonal pyramid will have 1 octagon and 8 triangles with 9 vertices
- Nets are the 2-D representation of 3-D figures
- So the pyramid can have different bases and be named after the base.

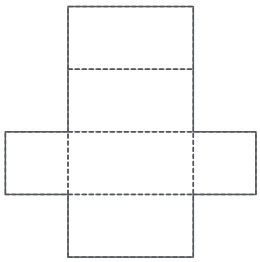
PRISMS

1

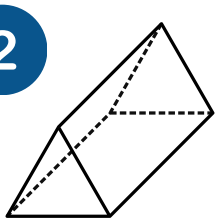


rectangular prism

- 6 planes : 6 rectangles
- 8 vertices
- 12 edges

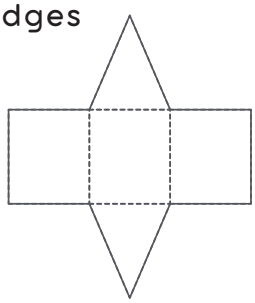


2

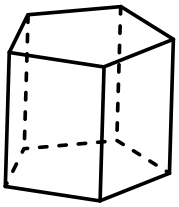


triangular prism

- 5 flat surfaces; 2 triangles and 3 rectangles
- 6 vertices
- 9 edges

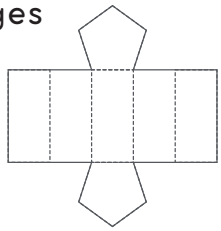


3

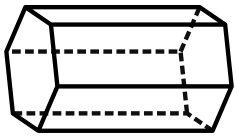


pentagonal (pentagonal) prism

- 7 flat surfaces: 2 pentagons and 5 rectangles
- 10 vertices
- 15 edges

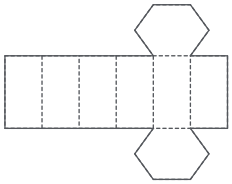


4

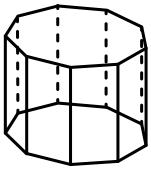


hexagonal (hexagonal) prism

- 8 flat surfaces: 2 hexagons and 6 rectangles
- 12 vertices
- 18 edges

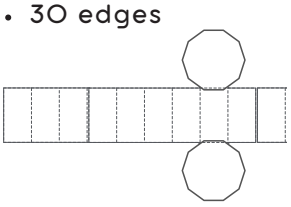


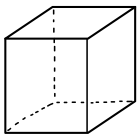
5



decagonal prism

- 12 flat surfaces: 2 decagons and 10 rectangles
- 20 vertices
- 30 edges

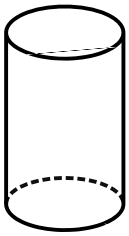




cube

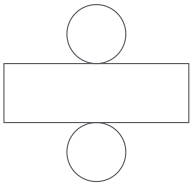
- 6 flat surfaces : 6 squares
- 8 vertices
- 12 edges
- prism with 6 identical faces

CYLINDER



3 flat surfaces: 2 circles and 1 rectangle

2 curved edges no vertices

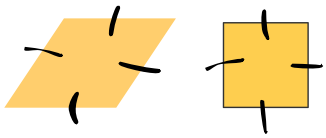


PERIMETER, AREA AND VOLUME

perimeter : the total distance when you add up all the sides of a shape
area : the total square units that will fit inside a shape
volume : the total space taken up by a figure capacity : how much something CAN hold
regular polygon : closed 2- D shape with only straight sides that are all the same length
irregular polygon : closed 2-D shape with only straight sides & side lengths differ.

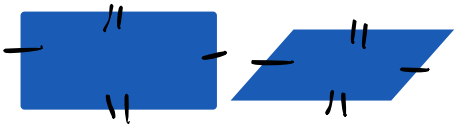
CIRCUMFERENCE

The perimeter of regular polygons is very easy - you multiply the number of sides by one side length. An equilateral triangle's perimeter will therefore be 3S (3 x side length) instead of the long method S + S + S
A regular hexagon's perimeter is 6S



rhombus & square

4S (4 x SY)



rectangle and parallelogram

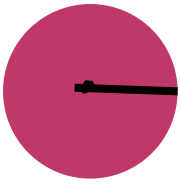
2l + 2w

(2 x length) + (2 x width)

triangle

S + S + S

OR equilateral triangle is 3S



circle

$2\pi r$

2 x PI x radius

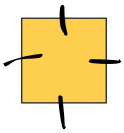
$\pi = 3.14$

For all other polygons you just have to remember: perimeter is the sum of all the sides

REMEMBER YOUR UNIT in your answer : cm; mm; m

SURFACE

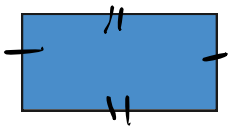
REMEMBER: area is always measured in square units.
Your answer MUST indicate the unit in square units.



square

S x S : side x side

S^2 side squared

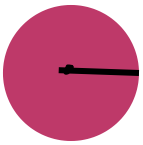


rectangle

l (length) x w (width)

triangle

$\frac{1}{2}$ x base x perpendicular height



circle

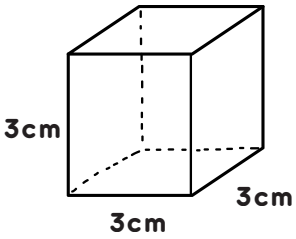
πr^2

PI x radius x radius

$\pi = 3.14$

OUTSIDE SURFACE OF A CUBE OR RECTANGULAR PRISM

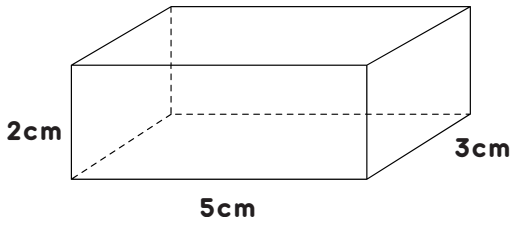
The outer surface of a 3-D figure will be the sum of the area of all the flat surfaces.



A cube consists of 6 squares. So you calculate the surface of one square and multiply it by 6 to calculate the outside surface of the cube.

S x S x 6

3cm x 3cm x 6 = 9 x 6 = $54cm^2$



A rectangular prism consists of rectangles.

Calculate the area of each rectangle and add it up.

(l x w x 2) + (w x h x 2) + (l x h x 2) = (5 x 3 x 2) + (5 x 2 x 2) + (3 x 2 x 2)

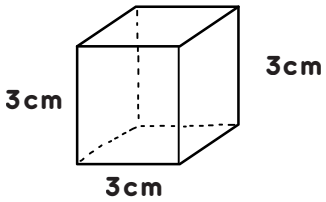
2 bases top and bottom; 2 left and right ; 2 front and back

$=30cm^2 + 20cm^2 + 12cm^2 = 62cm^2$

VOLUME

3

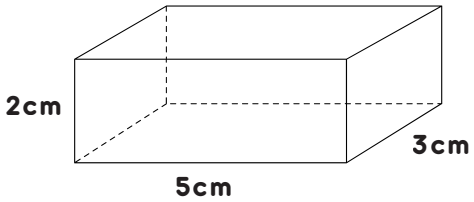
REMEMBER : volume is always calculated in cubic units.
Your answer MUST indicate the unit in cubic units.
Volume calculates the content of a 3-D figure.



square

S x S x S OR S^3

3cm x 3cm x 3cm = 27 cm^3



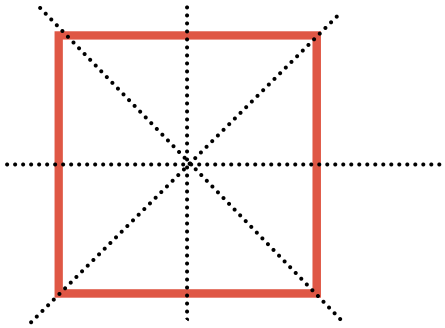
rectangular prism

l x w x h : length x width x height

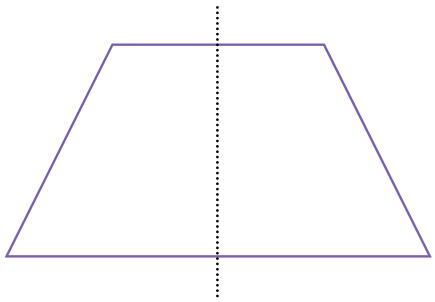
5cm x 3cm x 2cm = 30cm^3

SYMMETRY

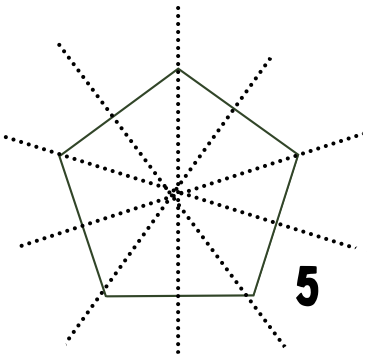
The division of a shape so that one side of the dotted line looks exactly like the other side.
A shape can have more than one line of symmetry e.g. A regular pentagon will have 5 lines of symmetry.



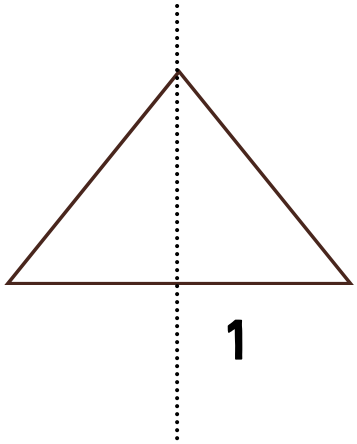
4



1



5



1

TRANSFORMATION GEOMETRY

There are four transformations:

translation: a shape moves left, right, up and down

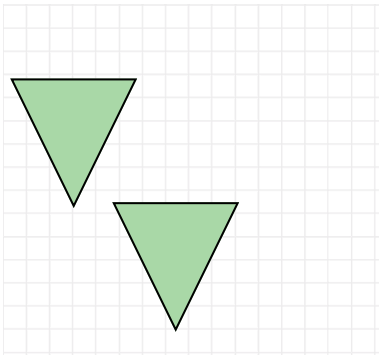
reflection: a shape is reversed opposite an axis to form a mirror image

rotation: a shape rotates around an axis

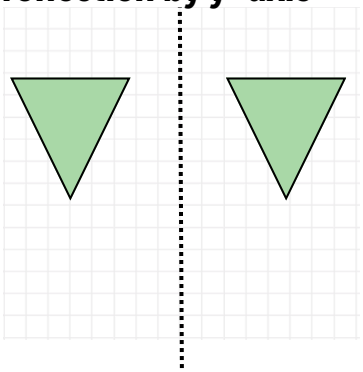
dilation : enlarge or reduce by a factor

ABC ⟶ A'B'C'

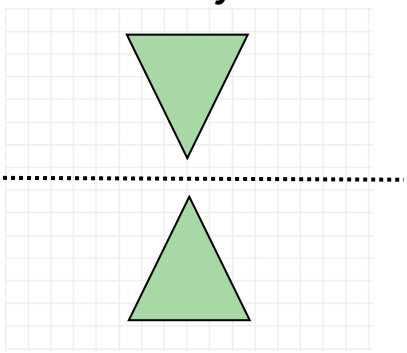
translation



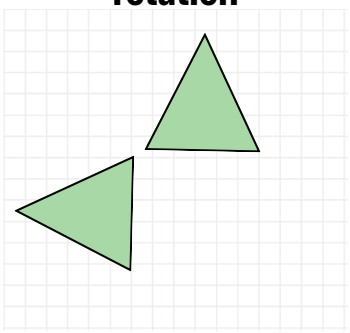
reflection by y-axis



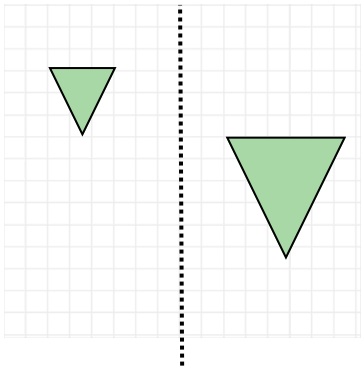
reflection by x-axis



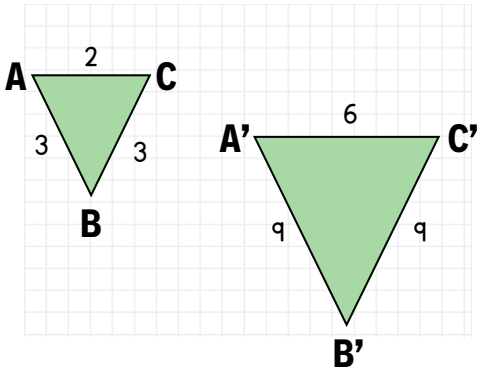
rotation



enlarge



You can calculate the factor between two shapes by dividing the sides of FORM TWO by the sides of FORM ONE (THE ORIGINAL SHAPE).



$\frac{A'B'}{AB} = \frac{9}{3} = 3$

$\frac{B'C'}{BC} = \frac{9}{3} = 3$

$\frac{A'C'}{AC} = \frac{6}{2} = 3$

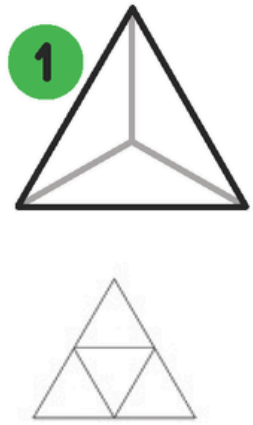
Triangle ABC is enlarged by a factor of 3 to triangle A'B'C'

🔷 Platonic Solids

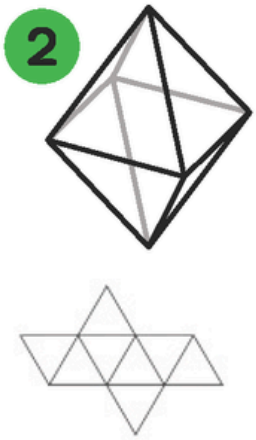
A Platonic solid is a 3D shape where:

- All faces are the same regular polygon (equal sides & equal angles).
- All faces are the same size.
- All vertices (corners) are the same.
- There are only 5 Platonic solids.

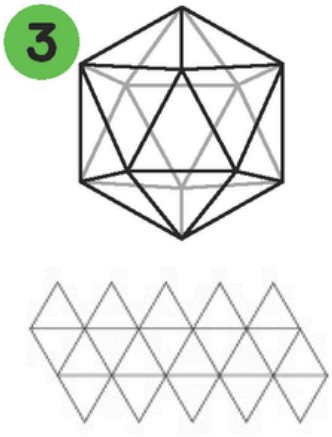
1. **Tetrahedron**
Faces: 4
equilateral triangles
Vertices: 4
Edges: 6



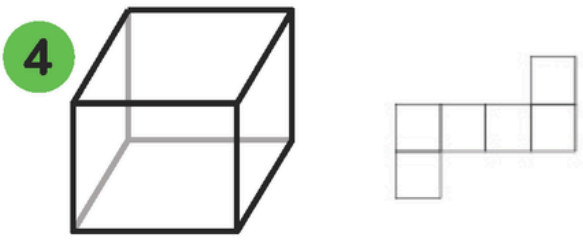
2. Octahedron
Faces: 8
equilateral triangles
Vertices: 6
Edges: 12



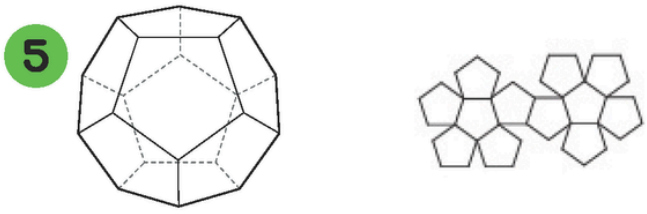
3. Icosahedron
Faces: 20
equilateral triangles
Vertices: 12
Edges: 30



4. Hexahedron (Cube)
Faces: 6 squares
Vertices: 8
Edges: 12



5. Dodecahedron
Faces: 12 regular pentagons
Vertices: 20
Edges: 30



✅ **Quick Memory Tip:**

triangle-based solids → tetrahedron, octahedron, icosahedron

square-based → cube (hexahedron)

pentagon-based → dodecahedron