Unit 7

Geometry

Learning Outcomes

After completing this unit, you will be able to:

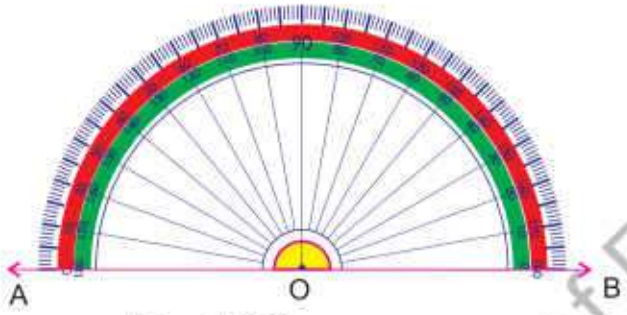
- Recognize straight and reflex angle.
- Recognize the standard units for measuring angles is 1°, which is defined as $\frac{1}{360}$ of a complete revolution.
- Identify, describe and estimate the size of angles.
- Classify angles as acute, right or obtuse.
- Compare angles with right angles and recognize that a straight line is equivalent to two right angles.
- Use protractor and ruler to construct:
  - A right angle
  - A straight angle
  - Reflex angles of different measures
- Describe adjacent, complementary and supplementary angles.
- Identify and describe triangles with respect to their sides. (isosceles, equilateral, and scalene)
- Identify and describe triangles with respect to their angles. (Acute angled triangle, Obtuse angled triangle and right-angled triangles).
- Use protractor and ruler to construct a triangle when:
  - two angles and their included side is given.
  - two sides and included angle is given.
- Measure the lengths of the remaining sides and angles of the triangle.
- Recognize the kinds of quadrilateral (square, rectangle, parallelogram, rhombus, trapezium, and kite).
- Identify and describe properties of quadrilaterals including square, rectangle, parallelogram, rhombus, trapezium, and kite, and classify those using parallel sides, equal sides and equal angles.
- Use protractor and ruler to construct square and rectangle when lengths of sides are given.
- Recognize different types of symmetry (Reflective and Rotational) in 2-D figures.
- Identify lines of symmetry for given 2-D figures.
- Find point of rotation and order of rotational symmetry of given 2-D figures.
- Identify cubes, cuboids and pyramids from their nets.

Hamad visits the hill station. He saw the reflection of mountain in the water which looks same as the mountain. Can you tell what is the relation between the mountain and its reflection?

Angles

We know that there exists different angles in different objects around us. I have a paper fan. If I open it straight then tell which angle will be made?

After opening it straight, both sides of the paper fan will be in front of each other. The angle which will make between them is called straight angle and it is of 180°.



∠O = 180°

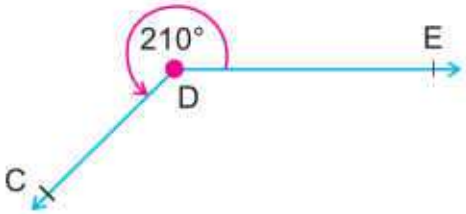
This is a straight angle.

Key Fact

The unit to measure the angle is degree(°). OA is a ray, when this ray completes one part of the whole revolution, then we can say that the angle between ray OA and the next point is of 1°.

An angle of measure 180° is called straight angle.

This ∠D is greater than 180° but smaller than a complete rotation which is 360°. Such angles are called reflex angles.



Key Fact

The standard unit of measuring angle is degree and written as '°'.
The angle is represented by '<'.

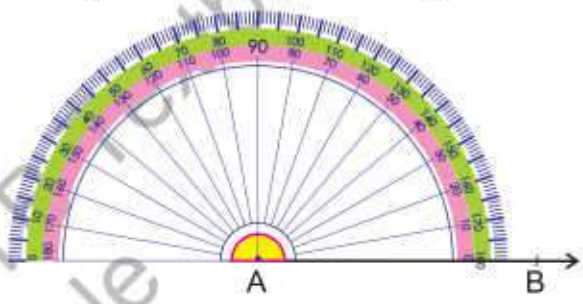
Make a right angle using cardboard and then use it as a model angle to compare with the other angles.

Construction of Angles by Using Protractor

We construct an angle BAC = 90° by using protractor.

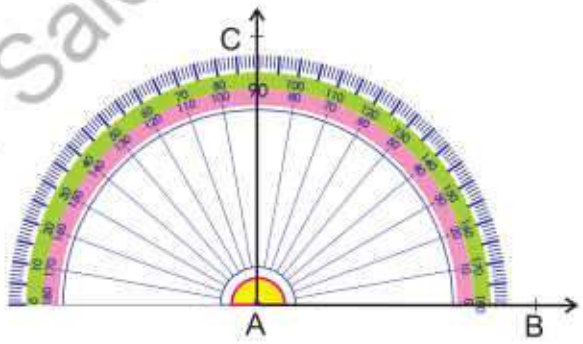
i) Draw a ray AB.

ii) Place the protractor on the ray AB such that the centre point of protractor is exactly at point A and the baseline of the protractor is aligned with the arm AB.



iii) Read the inner scale on the protractor and mark a point C at 90°.

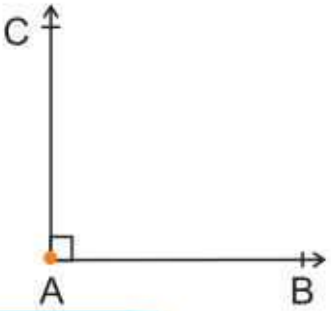
iv) Remove the protractor and join A to C.



Thus, ∠A = 90° is the required right angle.

∠A can also be written as ∠CAB or ∠BAC.

The letter A should remain between the other letters.



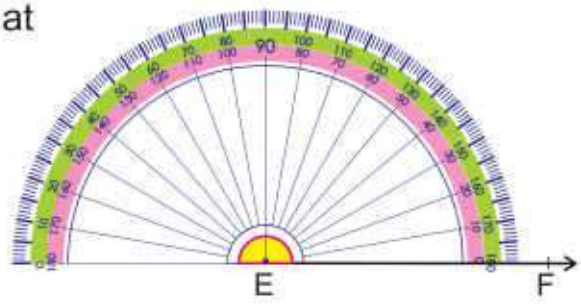
Try Yourself

How many 30° angles are there in a right angle?

Construct ∠DEF = 180° by using protractor.

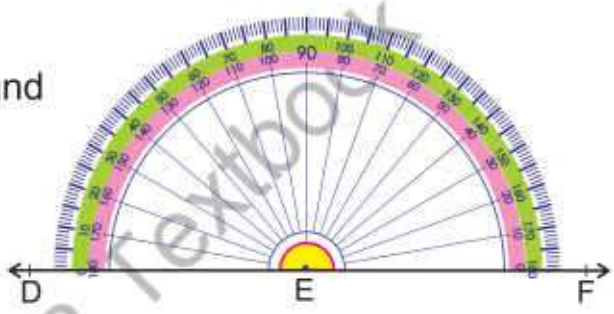
i) Draw a ray EF.

ii) Place the protractor on the ray EF such that the centre point of protractor is exactly at point E and the baseline of the protractor is aligned with the arm EF.



iii) Read the inner scale on the protractor and mark a point D at 180°.

iv) Remove the protractor and join D to E.



Thus, ∠E = 180° is the required straight angle.

Try Yourself

1. How many right angles are there in a straight angle?
2. How many straight angles are there in a complete rotation?

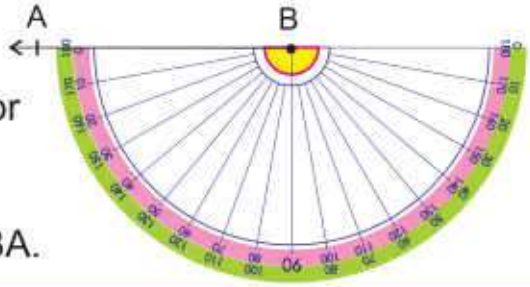
Construct ∠ABC = 285° by using protractor.

To construct a reflex angle of 285°, first we subtract the reflex angle from 360° and then draw the resulting angle, below the ray.

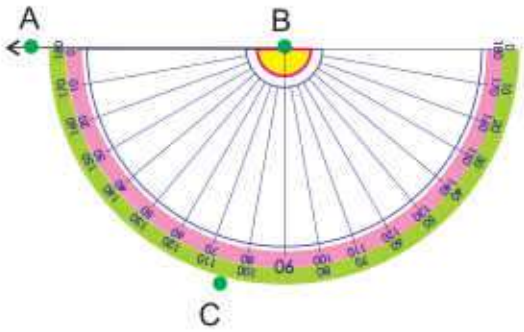
360° – 285° = 75°

i) Draw a ray BA.

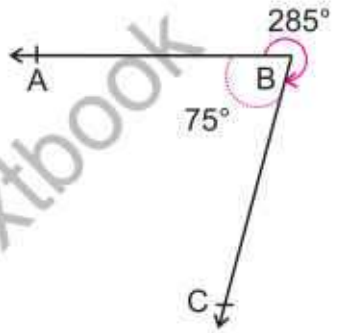
ii) Place the protractor upside down on ray BA, so that the centre of the protractor is exactly at point B and the baseline of the protractor is aligned with the arm BA.



iii) Read the inner scale on the protractor and mark a point C at 75°.



iv) Remove the protractor and join B to C.



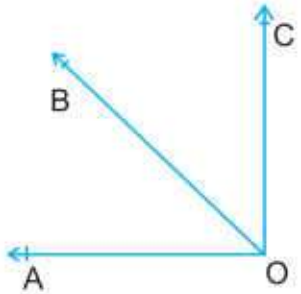
Thus, ∠B = 285° is the required reflex angle.

Pairs of Angles

Adjacent angles

Adjacent angles are two angles that have a common vertex and a common side. Look at the hands of the given clock that are making two adjacent angles.

The hour hand, the minute hand and the second hand are making two angles. The second hand is the common arm of both the angles. The centre of the clock is the common vertex of these two angles.



Ask the students to find adjacent angles in different objects around them.

Angle AOB is adjacent to angle BOC. Their common arm is OB and the common vertex is O.

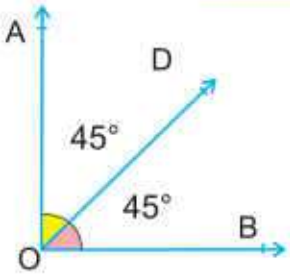
Key Fact

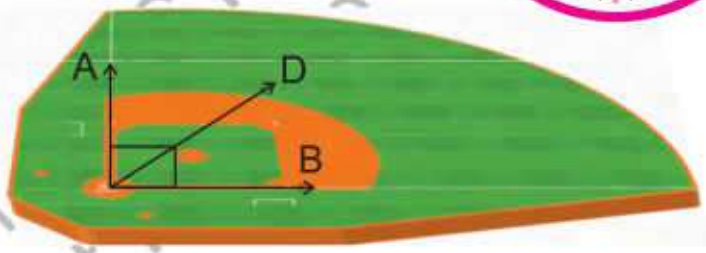
Two angles are called adjacent angles if:

- they have a common arm.
- they are on the opposite side of the common arm.
- they have a common vertex.

Complementary Angles

Look at the hands of the given clock. They are making angles and their sum is 90°. The pair of these angles are showing complementary angles.

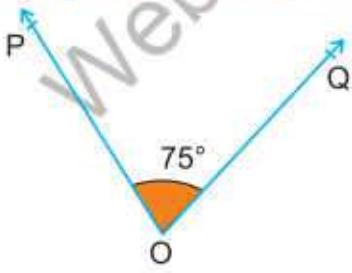


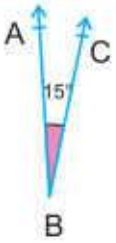


The ∠AOD and ∠DOB on the ground are complementary angles

$\angle AOD + \angle DOB = 45° + 45° = 90°$

Non-Adjacent Complementary Angles





$\angle O + \angle B = 75° + 15° = 90°$

Key Fact

Two angles are called complementary angles if their sum is 90°. One angle is the complement of the other angle. They may be adjacent or non-adjacent.

Try Yourself

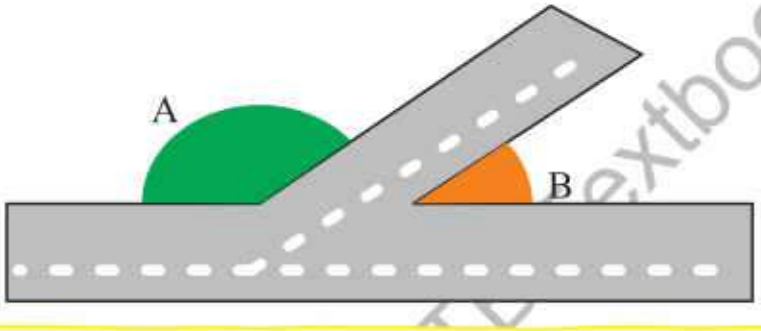
Can two right angles be the complementary angles of each other? Explain your answer.

TEACHING POINT

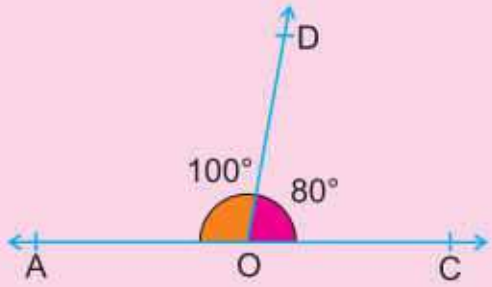
Ask the students to find complementary angles in the objects around them.

Supplementary Angles

Two angles are called supplementary angles, if their sum is 180°. They may be adjacent or non-adjacent.

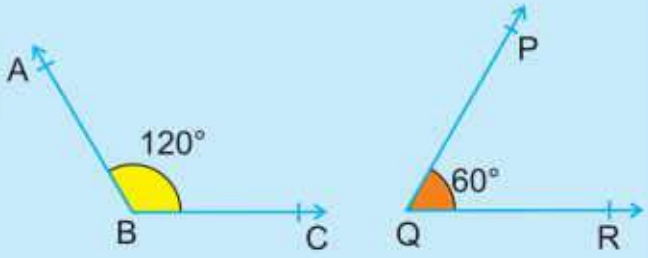


The angles i.e. ∠A and ∠B are called supplementary angles.



∠AOD + ∠DOC = 100°+ 80° =180°

Adjacent Supplementary Angles



∠ABC + ∠PQR = 120° + 60° = 180°

Non-Adjacent Supplementary Angles

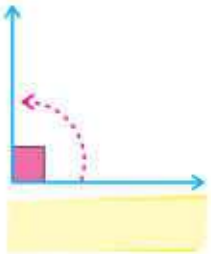
Try Yourself

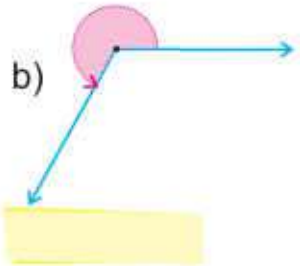
Can two straight angles be the supplementary angels of each other? Explain your answer.

Ask the students to find supplementary angles in the objects around them.

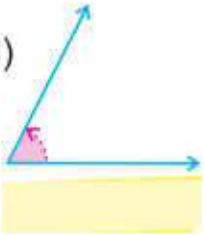
Exercise 1

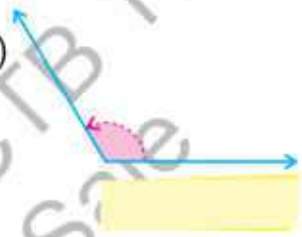
1. Draw a right angle by using card board and compare it with the given angles and indicate their types.

a) 

b) 

c) 

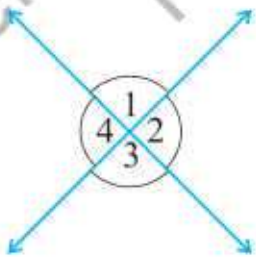
d) 

e) 

2. Use the protractor to draw the given angles.

a) 35° b) 45° c) 240° d) 180° e) 90° f) 60° g) 300° h) 155°

3. Identify adjacent angles from the given angles:



4. Find the supplements of the following:

a) 98° b) 180° c) 115° d) 3° e) 78° f) 135° g) 90°

5. Find the complements of the following:

a) 12° b) 88° c) 90° d) 10° e) 62° f) 40° g) 70°

Triangle

There is a sign board in front of our school. What is the shape of this board?

This board is in triangular shape as it has three sides. A simple closed figure having three sides and three angles is called a triangle.

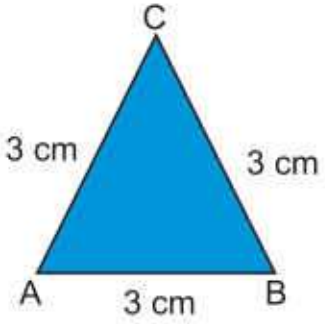
Types of Triangles with respect to their Sides

Equilateral Triangle

All the sides of the given triangle are equal in length.

As, AB = BC = CA = 3 cm

So, it is an equilateral triangle.



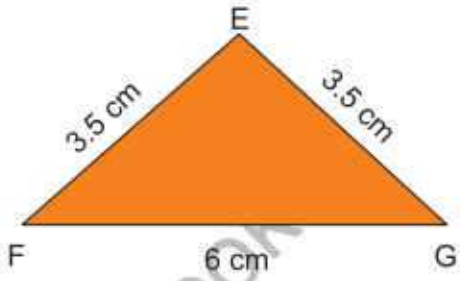
A triangle in which all the three sides are equal is called an equilateral triangle. All angle of an equilateral triangle are equal to 60°.

Isosceles Triangle

Two sides of the given triangle are equal in length.

As, EF = EG = 3.5 cm

So, this is an isosceles triangle.



A triangle in which two sides are equal, is called an isosceles triangle.

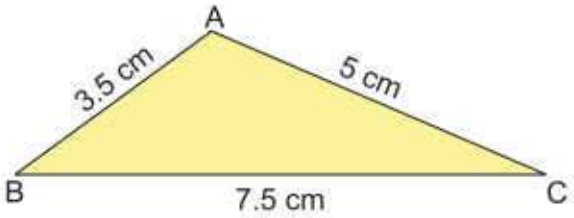
Two base angles of an isosceles are equal in measure.

Scalene Triangle

All the sides of the given triangle are different in length.

As, AB ≠ BC ≠ CA

So, It is a scalene triangle.



A triangle having all sides of different measure is called a scalene triangle. All angles in a scalene triangle are different in measure.

Try Yourself

Is every equilateral triangle an isosceles triangle?

Explain your answer.

Give the cut-outs of different types of triangles to the students and ask them to sort them with respect to their sides.

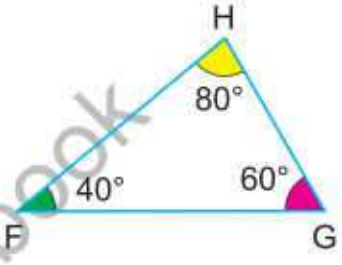
Types of Triangles with respect to their Angles

Acute Angled Triangle

All the angles of the given triangle FGH are acute.

As, $\angle F = 40^\circ$, $\angle G = 60^\circ$, $\angle H = 80^\circ$

So, this is an acute angled triangle.



Key Fact

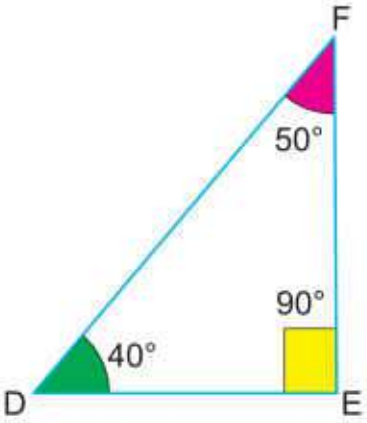
A triangle in which all angles are acute i.e. $< 90^\circ$, is called an acute angled-triangle.

Right Angled Triangle

One angle in the given triangle is a right angle.

As, $\angle E = 90^\circ$

So, this is a right angled-triangle.

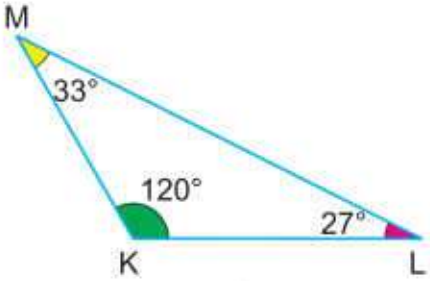


Key Fact

A triangle in which one angle is right angle (90°) is called a right-angled triangle.

Obtuse Angled Triangle

One angle in the given triangle LKM is obtuse.
As, $\angle K = 120^\circ$
This is an obtuse angled triangle.



A triangle in which one angle is obtuse i.e. > 90° is called an obtuse angled-triangle.

Construction of Triangle

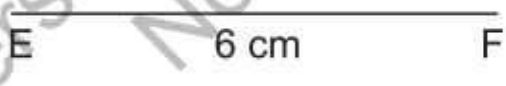
Construction of Triangle when 2 angles and included side is given

Construct a triangle EFG in which

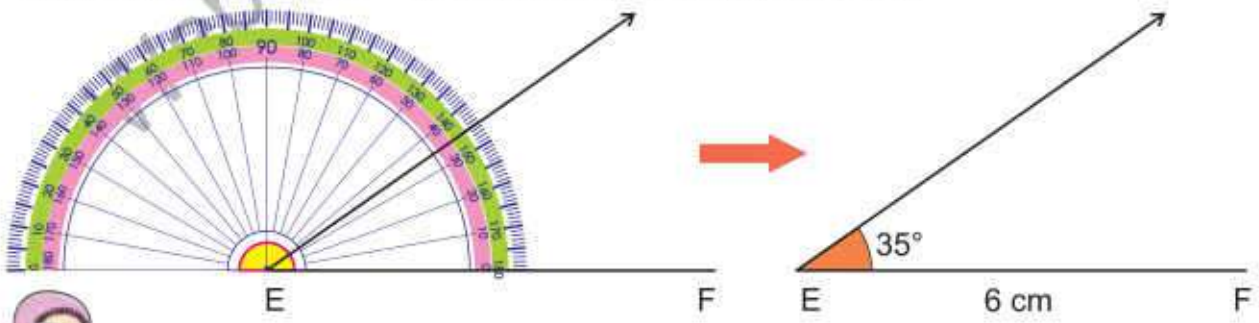
EF = 6 cm, $\angle E = 35^\circ$ and $\angle F = 70^\circ$.

Also find the measurement of the remaining sides and angle.

i) Draw a line segment EF = 6 cm by using ruler.



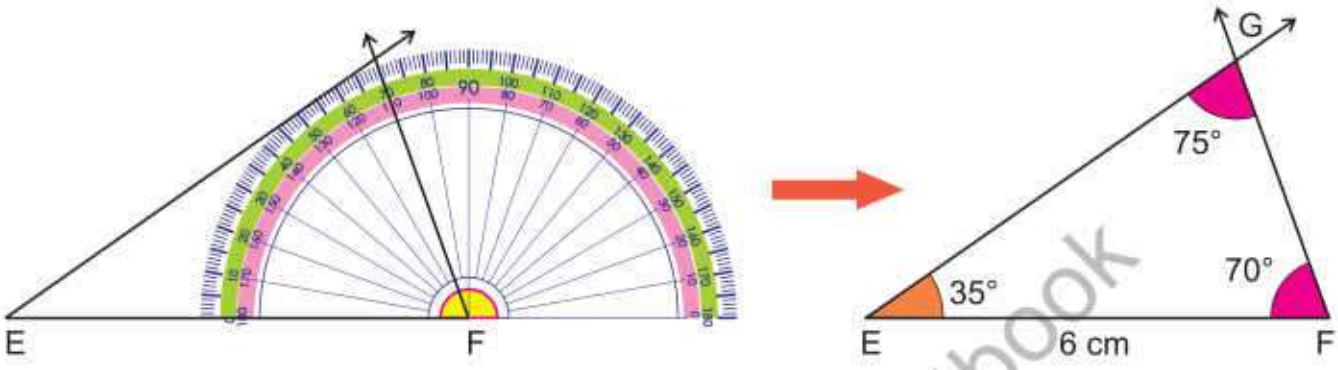
ii) Draw an angle of 35° at point E by using protractor.



Key Fact

Triangle is represented by the symbol Δ.
Sum of the interior angles of a triangle is 180°.

iii) Similarly, by using a protractor, draw another angle of 70° at point F. The two drawn rays intersect at point G.



So, EFG is the required triangle.

Now, calculate angle G.

$$\angle G = 180^\circ - (35^\circ + 70^\circ) = 180^\circ - 105^\circ = 75^\circ$$

Try Yourself

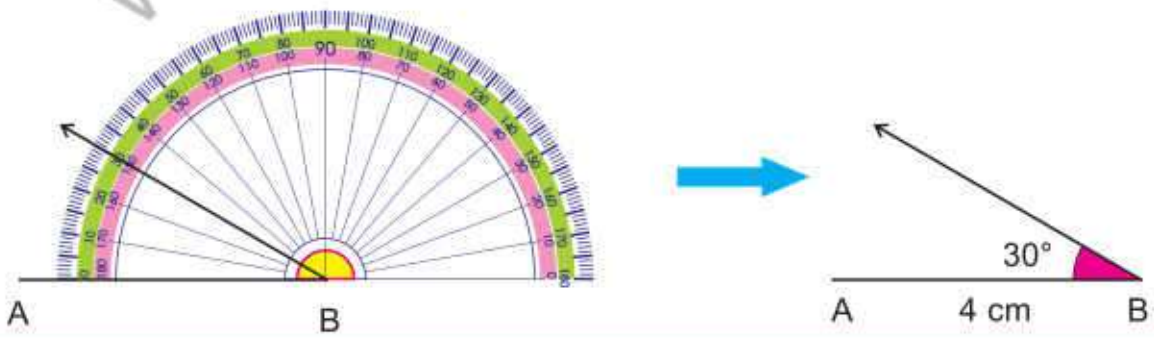
Measure EG and FG by using ruler.

Construction of Triangle when 2 sides and included angle is given

Construct a triangle ABC in which AB = 4cm, $\angle B = 30^\circ$ and BC = 3cm

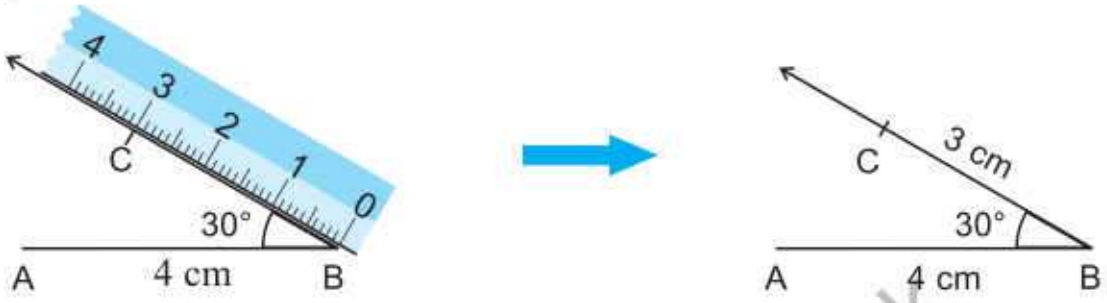
i) By using ruler, draw a line segment AB = 4 cm

ii) Use a protractor, to draw an angle of 30° at point B.

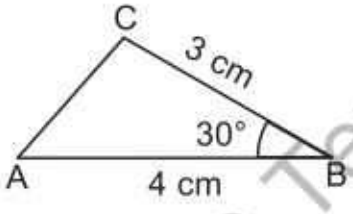


Use board geometry box and construct the triangles step by step. Ask the students to follow you and construct it on their notebooks.

iii) Mark a point C on the arm of 30° such that BC = 3cm.



iv) Use ruler to Join A to C.

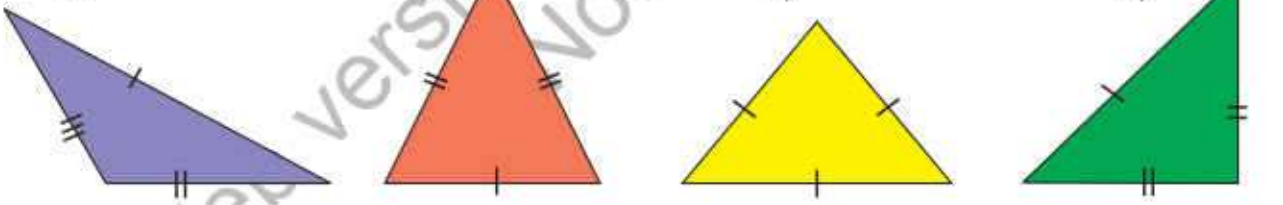


Thus, ΔABC is the required triangle.

Exercise 2

1. Identify these triangles with respect to their sides.

a) b) c) d)



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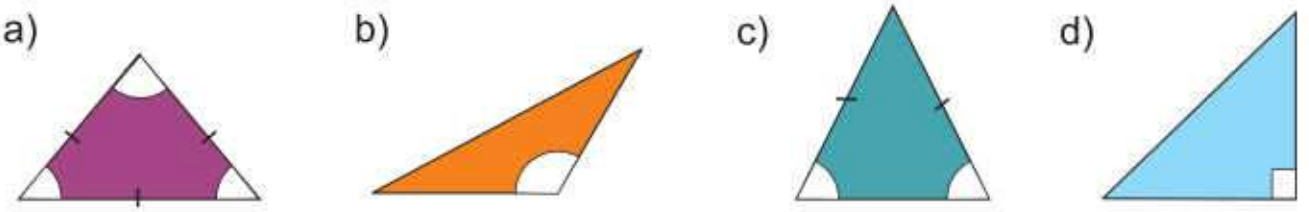
2. Identify these triangles with respect to their angles.

a) b) c) d)



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3. Draw a triangle ABC in which, $\angle A = 75°$, AB = 4 cm and $\angle B = 55°$.

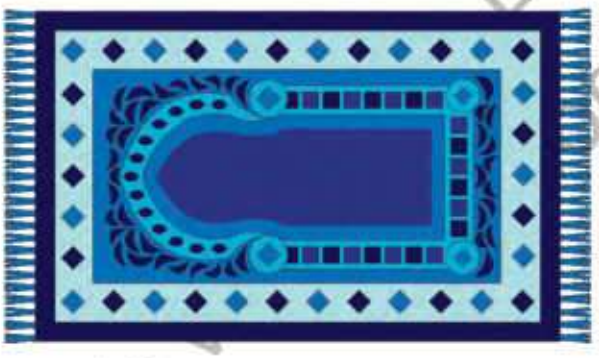
4. Draw a triangle LMN in which, $\angle L = 60°$, LM = 5.5 cm and $\angle M = 30°$.

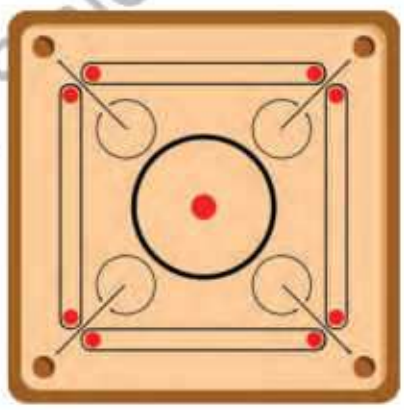
5. Draw a triangle JKL in which, KL = 4 cm, JK = 3.2 cm and $\angle K = 30°$.

6. Draw a triangle XYZ in which, YZ = 7.3cm, XY = 3.5 cm and $\angle Y = 40°$.

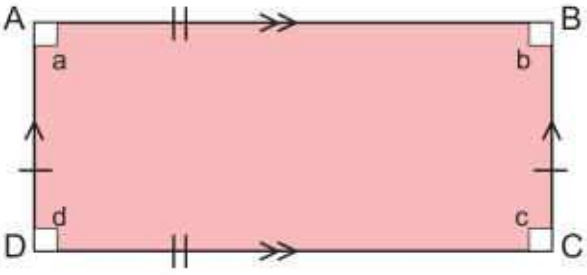
Quadrilaterals

There are various objects around us which have 4 sides. What do we call these shapes?





Shapes which have four sides and four angles are called quadrilaterals.



ABCD is a quadrilateral. AB, BC, CD and DA are its four sides. $\angle a$, $\angle b$, $\angle c$ and $\angle d$ are its four angles.

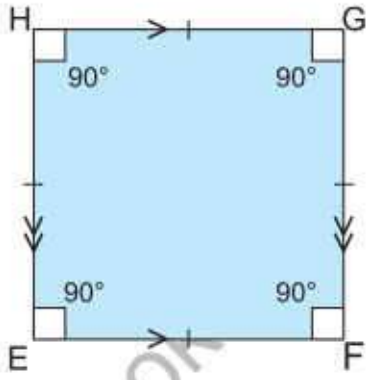
Types of Quadrilaterals

Square

A quadrilateral having four equal sides and four right angles is called a square.

As, EFGH is a square.

EF = HG = EH = FG



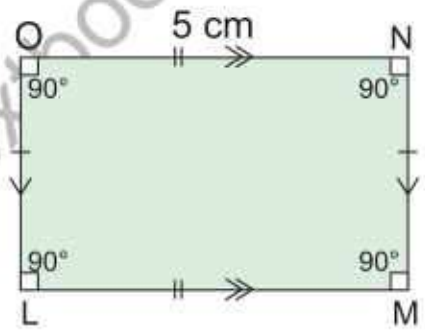
Rectangle

A quadrilateral having two pairs of parallel sides are equal in length, is called rectangle. In rectangle, all the angles are of 90°.

As, LMNO is a rectangle

LM = ON, LO = MN

LM || ON, LO || MN



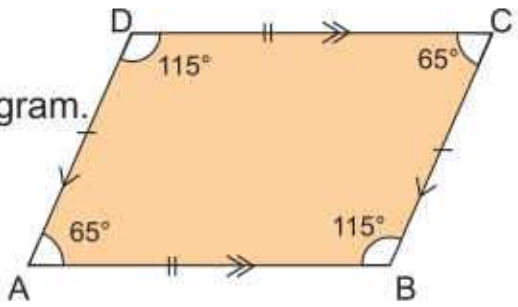
Parallelogram

A quadrilateral having two pairs of parallel sides and opposite angles are equal, is called parallelogram. But none of the angles is right angle.

As, ABCD is a parallelogram.

AB = DC, AD = BC

AB || DC, AD || BC



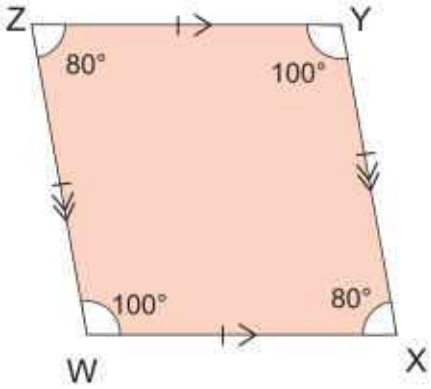
Rhombus

A quadrilateral having all sides are equal and parallel, is called a rhombus. In rhombus, opposite angles are equal but not right angle.

WXYZ is a rhombus.

WX = ZY, WZ = XY

WX || ZY, WZ || XY

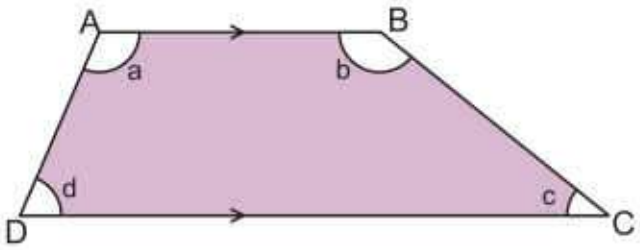


Divide the student in groups. Ask each group to compare any two quadrilaterals and write their properties.

Trapezium

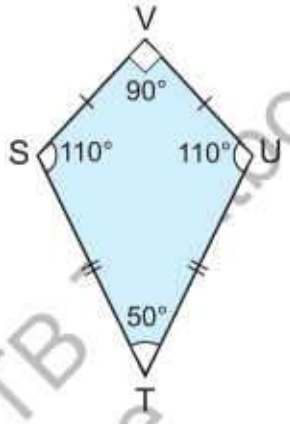
A quadrilateral having only one pair of parallel sides, is called a trapezium.
ABCD is a trapezium.

AB || DC



Kite

A quadrilateral having two equal pairs of adjacent sides, is called a kite.
As, STUV is a trapezium.
SV = UV, ST = UT

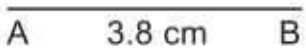


Construction of a Square and a Rectangle

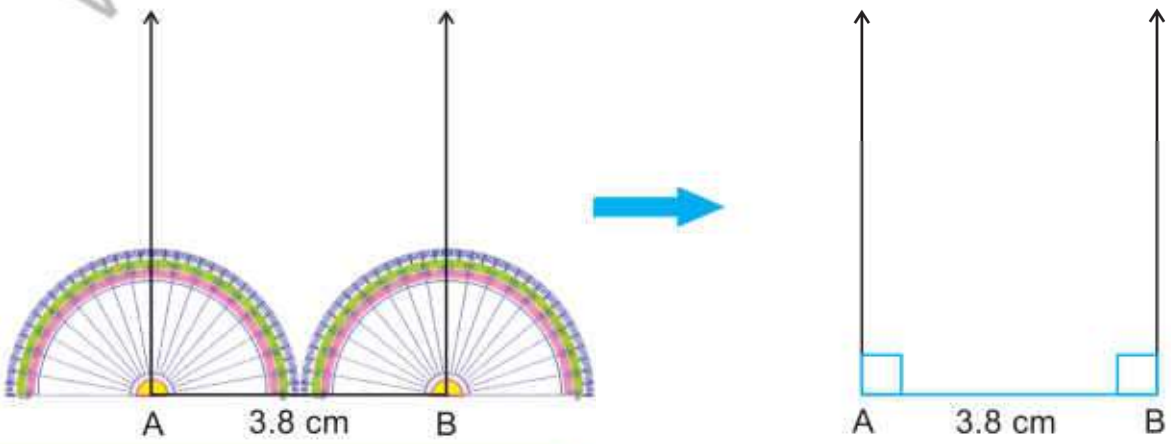
Construction of a square

Construct a square ABCD whose length of a side is 3.8 cm.

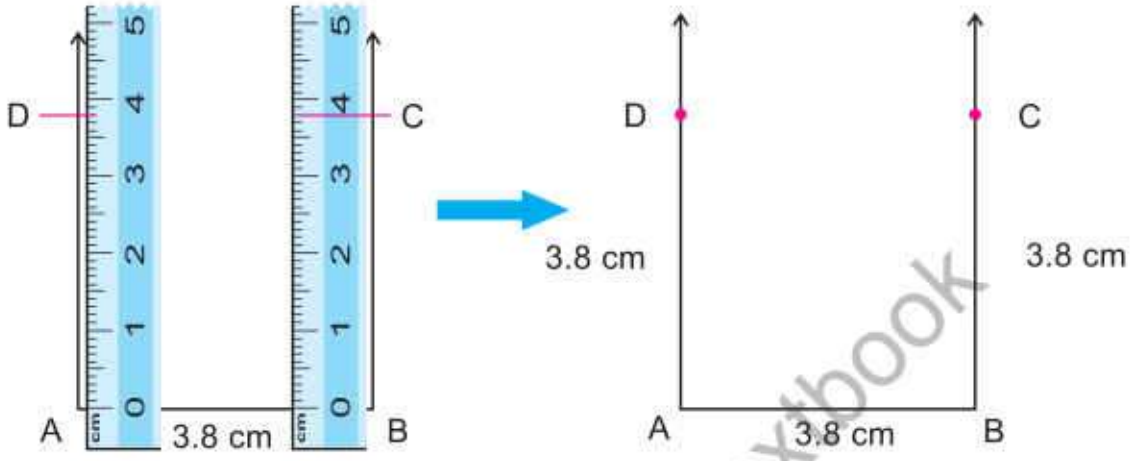
i) Draw a line segment AB = 3.8 cm.



ii) By using a protractor draw right angles at point A and B.

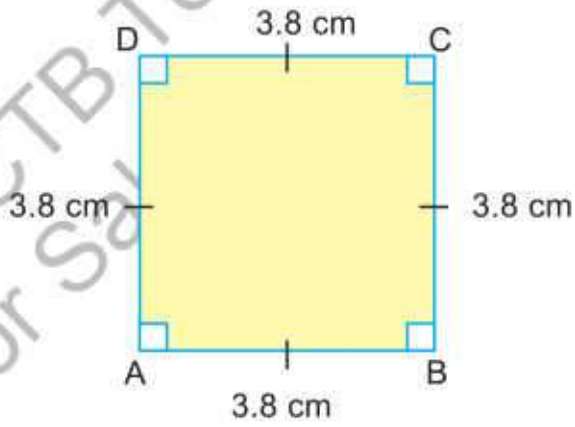


iii) Mark points D and C such that AD = BC = 3.8 cm.



iv) Join point C to D

So, ABCD is the required square.

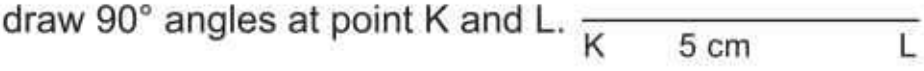


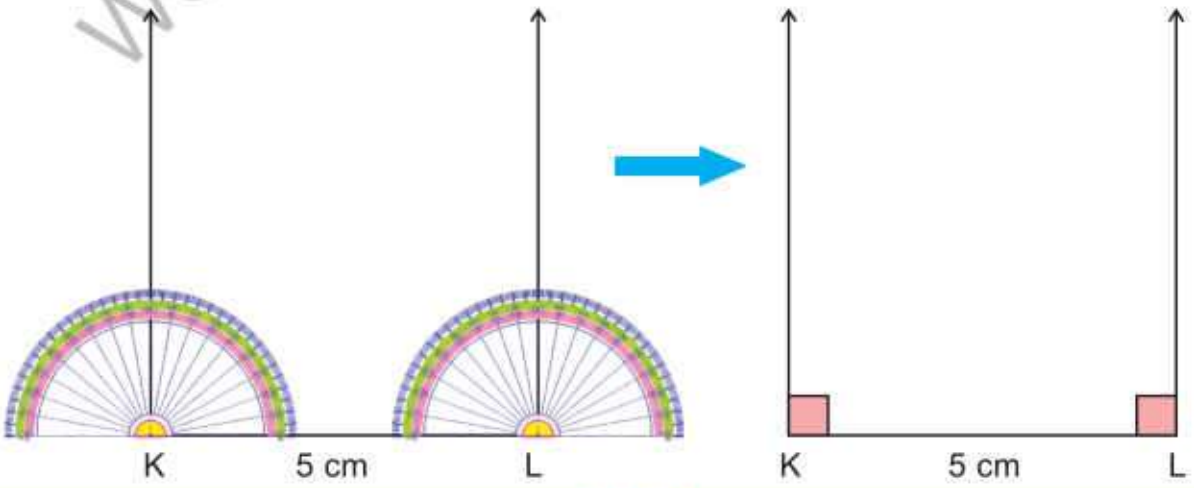
Construction of a rectangle

Construct a rectangle KLMN whose length is 5 cm and width is 2 cm.

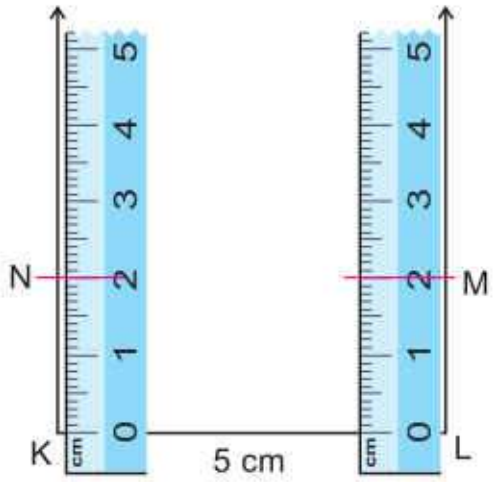
i) Draw a line segment KL = 5 cm.

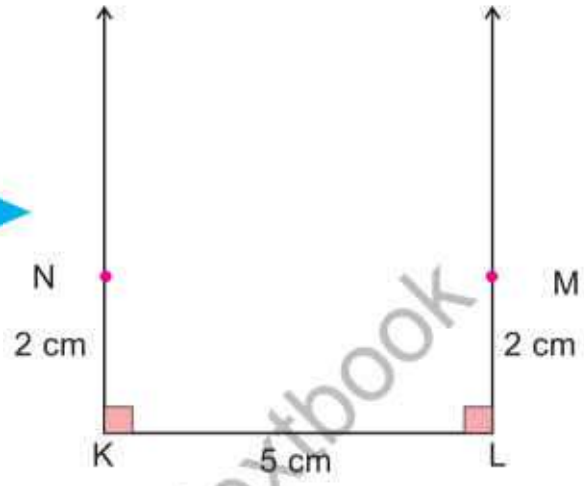
ii) By using a protractor draw 90° angles at point K and L.





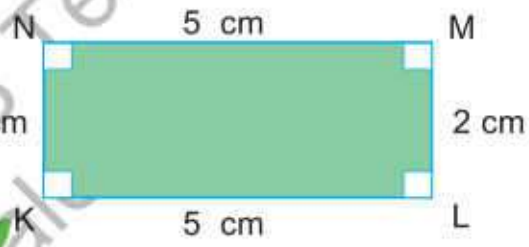
iii) Mark points M and N such that LM = KN = 2cm.





iv) Join point M to N.

Thus, KLMN is the required rectangle.



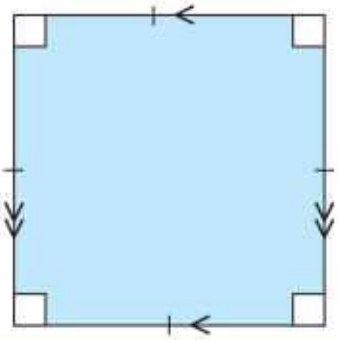
Try It!

Is every square a rectangle? Is every rectangle a square? Is every rhombus a parallelogram? Is every parallelogram a rhombus? Explain your answers.

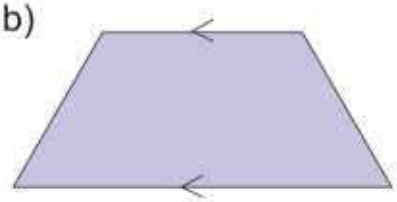
Exercise 3

1. Label the following quadrilaterals and describe at least two properties of each (in terms of sides and angles):

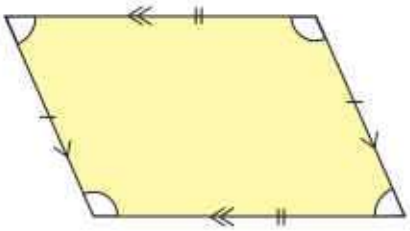
a)



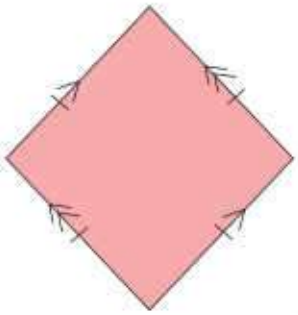
b)



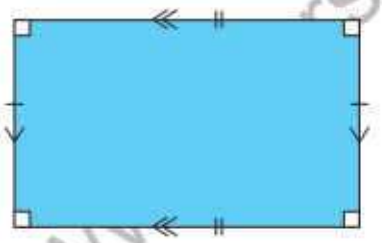
c)



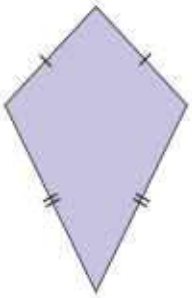
d)



e)



f)



2. Draw squares according to the given lengths by using protractor and ruler.

a) 3.4 cm b) 5 cm c) 7.2 cm d) 4 cm

e) 6.3 cm f) 5.5 cm g) 8.9 cm h) 3.3 cm

3. Draw rectangles by using protractor and ruler according to the given lengths and widths.

a) 7 cm, 5 cm b) 8 cm, 4.4 cm

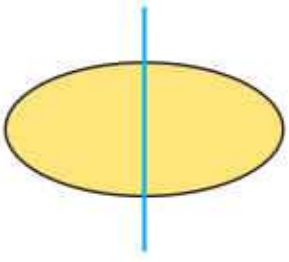
c) 6.6 cm, 3.4 cm d) 8.5 cm, 5 cm

e) 6 cm, 3.2 cm f) 9 cm, 5.2 cm

Symmetry

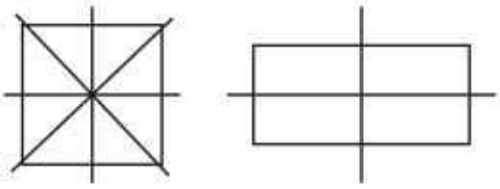
I have two different types of leaves pasted on my notebook. I have observed that the left and right sides of the leaves are exactly same.
If we fold the leaf about the mid wain one half will exactly fit the other half.

Observe these figures. They have reflective symmetry in them. The blue line is the line of symmetry which is dividing the shapes into two parts.



The symmetry of figure about its line of symmetry may be tested by folding it along that line. If the figure is symmetrical, the part to the left of the line will fit exactly on to the part of right of the line and vice versa. This is called reflective symmetry.

A figure may have more than one line of symmetry, for example a square has four lines of symmetry and the rectangle has two lines of symmetry.

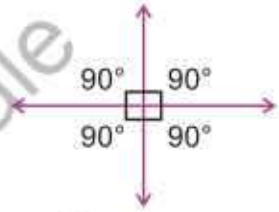


Try Yourself

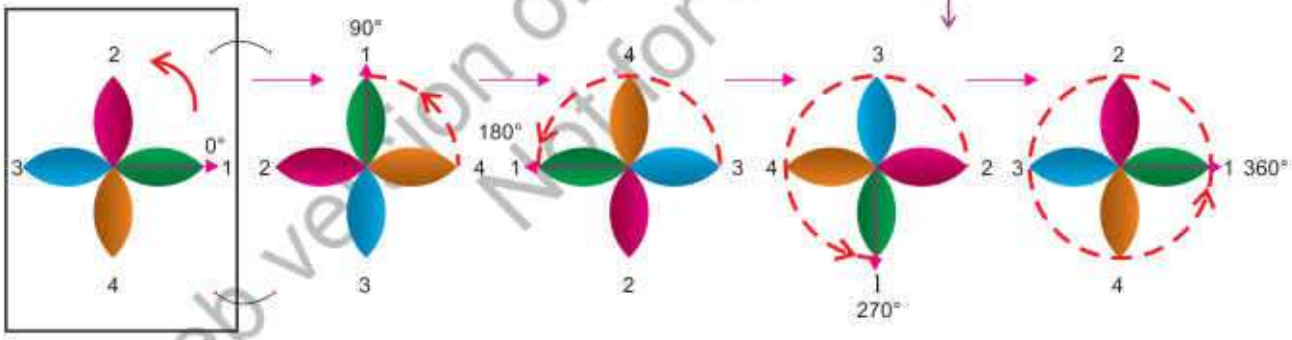
Does the shapes have reflective symmetry?
Explain your answer.

A part from reflective symmetry, there is another type of symmetry which is called rotational symmetry.

A complete revolution has 4 rotations of 90°.



Let's observe this shape.



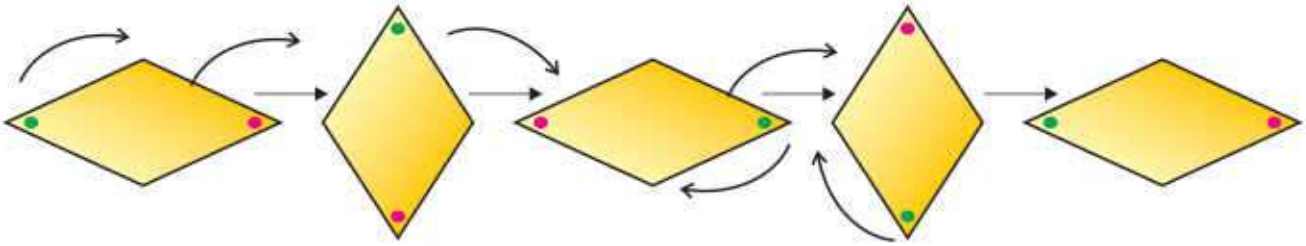
We can see that when it is rotated around its centre, it is an angle of 90° looks exactly the same 4 times. It means it has a rotational symmetry and the order of its rotational symmetry is 4.

Key Fact

The number of times a shape looks exactly the same is called the order of its rotational symmetry. The centre of the shape is called the centre of rotation.

A figure will have rotational symmetry if it is rotated about its centre point and looks exactly the same at least two times during the full rotation.

Now, observe at the following figures:



We can see that when the shape is rotated about its centre, it looks exactly the same twice. It means it has a rotational symmetry of order 2.

Try Yourself

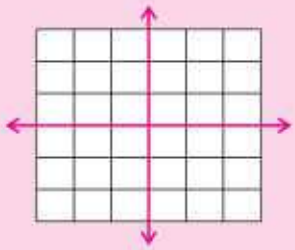
Do these shapes have rotational symmetry? Explain your answer.

Look at the following:

When it is rotated about its centre, it looks exactly the same only once. It means, there is no rotational symmetry.

Try It! Challenge

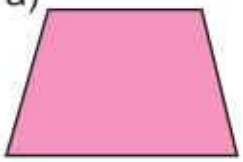
Colour the given boxes in such a way that the shape becomes symmetrical along the horizontal and vertical lines.

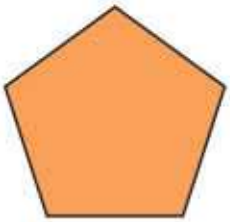


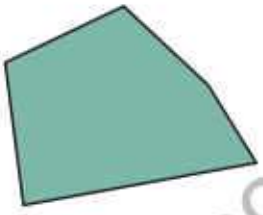
Ask the students to cut different shapes using a cardboard. Then ask them to identify shapes with reflective symmetry and rotational symmetry.

Exercise 4

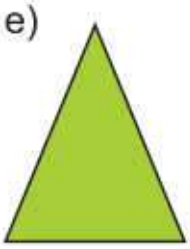
1. Encircle the figures which have reflective symmetry. Also draw their line of symmetry.

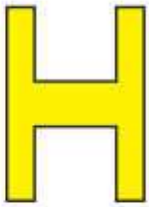
a) 

b) 

c) 

d) 

e) 

f) 

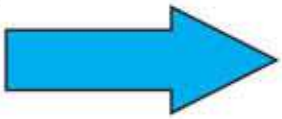
g) 

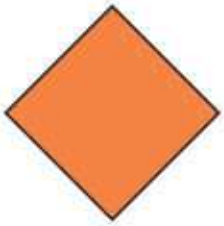
h) 

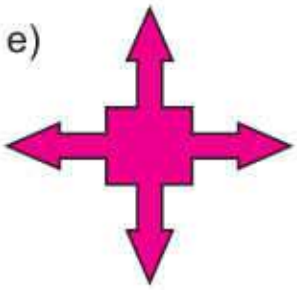
2. Encircle the figures having rotational symmetry. Also write the order of their rotation and mark their centre of rotation.

a) 

b) 

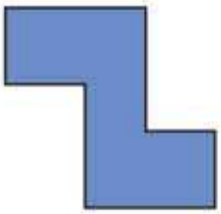
c) 

d) 

e) 

f) 

g) 

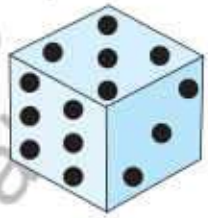
h) 

Nets of 3-D Shapes

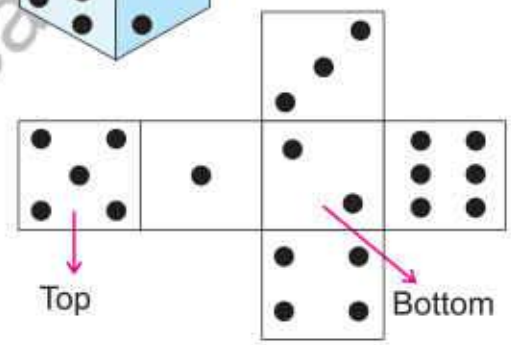
I want to make a dice by using cardboard to play with my friends. How can I make it?

Dice is a cube which is a 3-dimensional solid shape. All 3-dimensional solids are made up of different 2-dimensional shapes.

If we separate out all the sides of a cube, then we can see that it is made of 6 similar squares. These squares make the net of a cube.



We can see that dice is a 3-dimensional shape which can be unfolded in a specific pattern to get 6 2-dimensional surfaces.



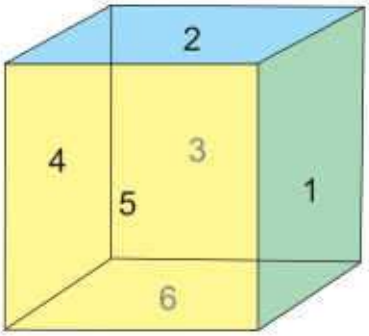
Key Fact

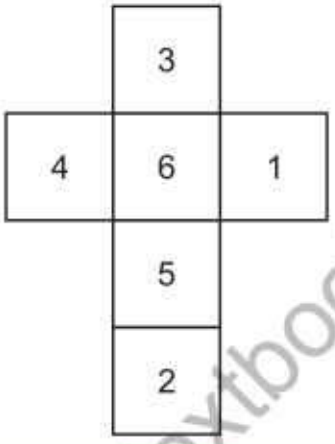
- A net is a 2-dimensional shape which can be folded in a specific pattern to get a 3-dimensional solid.
- 3-dimensional solid can have more than one possible nets.

Try Yourself

Make at least three to four solid shapes and describe their properties.

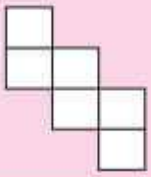
Look at the given figures. On the left side there is a cube and on the right side there is the net of the cube. It is made of 6 squares.





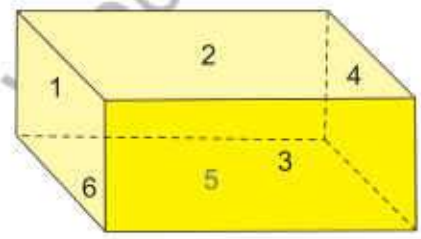
Try Yourself

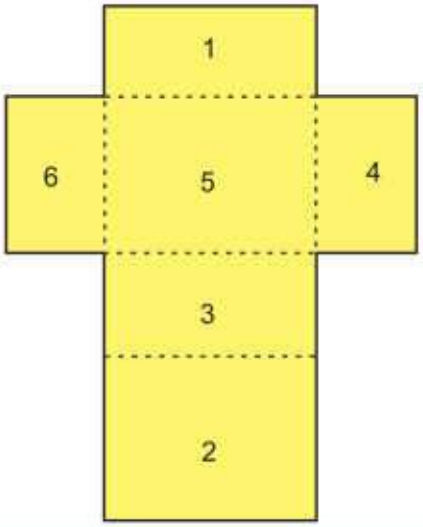
Tell if the given net is the net of a cube or not?



Observe the net of a cuboid.

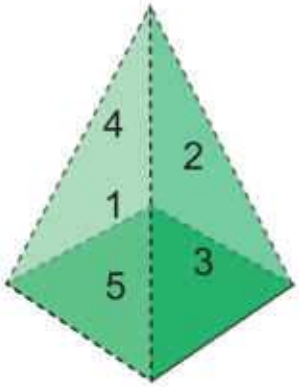
On the left side, there is a cuboid and on the right side there is the net of the cuboid. It is made of 6 rectangles.

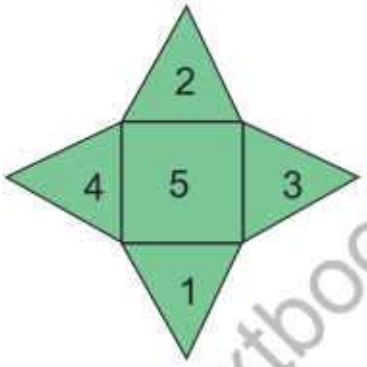




Divide the students into groups and provide them papers in different colours. Ask them to cut these papers to make three dimensional solids and observe their nets.

Look at the given figure. On the left side there is a square based pyramid and on the right side there is the net of the pyramid. It is made of 4 triangles and 1 square.

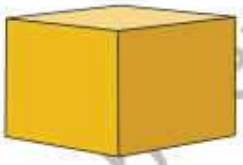


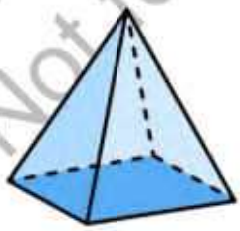


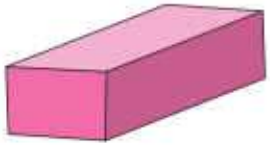
Net of a square pyramid

Exercise 5

1. Write the names of these figures. Also write the number and name of faces.

a) 

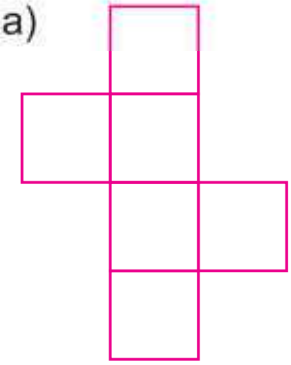
b) 

c) 

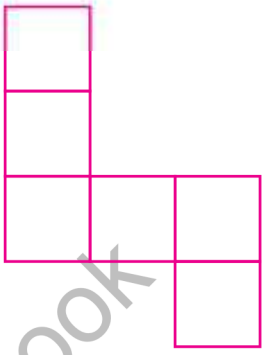
Name of 3-D shape	a)	b)	c)
Number of faces			
Names of faces			

2. Identify the nets of cube and colour them.

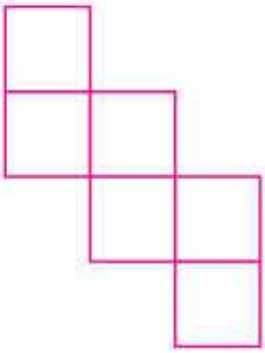
a)



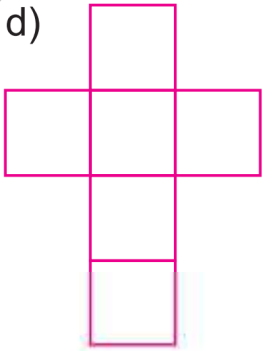
b)



c)

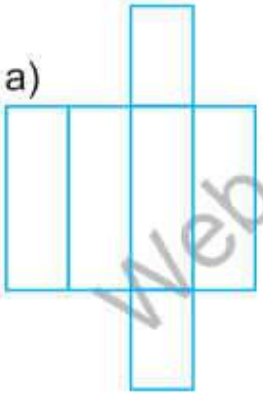


d)

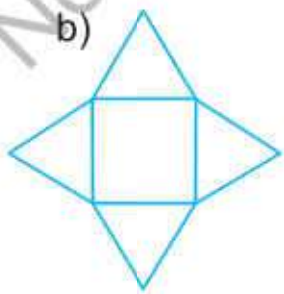


3. Observe these nets and identify the 3-D solid they are made of.

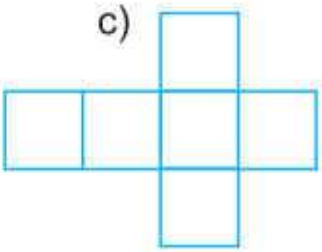
a)



b)

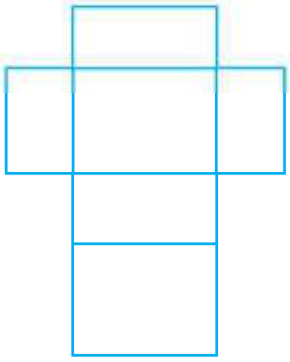


c)



d)

e)



I Have Learnt to:

- recognize straight and reflex angle.
- recognize the standard units for measuring angles is 1°, which is defined as $\frac{1}{360^{\circ}}$ of a complete revolution.
- identify, describing and estimating the size of angles.
- classify angles as acute, right or obtuse.
- compare angles with right angles and recognize that a straight line is equivalent to two right angles.
- use protractor and ruler to construct:
  - a right angle
  - a straight angle
  - reflex angles of different measures
- describe adjacent, complementary and supplementary angles.
- identify and describing triangles with respect to their sides. (isosceles, equilateral, and scalene).
- identify and describing triangles with respect to their angles. (Acute angled triangle, Obtuse angled triangle and right-angled triangles).
- use protractor and ruler to construct a triangle when:
  - two angles and their included side is given.
  - two sides and included angle is given.
- measure the lengths of the remaining sides and angles of the triangle.
- recognize the kinds of quadrilateral (square, rectangle, parallelogram, rhombus, trapezium, and kite).

Vocabulary

- Right angle
- Acute angle
- Reflex angle
- Adjacent angles
- Complementary angles
- Supplementary angles
- Triangle
- Equilateral Triangle
- Isosceles Triangle
- Scalene Triangle
- Acute Angled Triangle
- Obtuse Angled Triangle
- Right Angled Triangle
- Quadrilaterals
- Symmetry
- Nets
- Parallelogram
- Rhombus
- Pyramids

- identify and describe properties of quadrilaterals including square, rectangle, parallelogram, rhombus, trapezium, and kite, and classify those using parallel sides, equal sides and equal angles.
- use protractor and ruler to construct square and rectangle when lengths of sides are given.
- recognize different types of symmetry (Reflective and Rotational) in 2-D figures.
- identify lines of symmetry for given 2-D figures.
- find point of rotation and order of rotational symmetry of given 2-D figures
- identify cubes, cuboids and pyramids from their nets.
- describe and make 3-D objects (cubes, cuboids, cylinder, cone, sphere, pyramids).

Review Exercise

1. Choose the correct options and fill in the blanks.

a) Which of these is a reflex angle?

i) 375° ii) 215° iii) 180° iv) 90°

b) The supplement of 20° is:

i) 160° ii) 40° iii) 70° iv) 80°

c) Sum of two right angles is equal to:

i) Reflex angle ii) Straight angle iii) Acute angle iv) Obtuse angled

d) Two angles will be called supplementary angles if their sum is equal to :

i) 180° ii) 90° iii) 360° iv) 100°

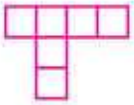
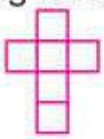
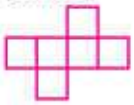
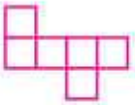
e) Which of the following shapes is not a quadrilateral?

i)  ii)  iii)  iv) 

f) A triangle in which its _____sides are equal, is called an isosceles triangle.

i) 1 ii) 2 iii) 3 iv) 4

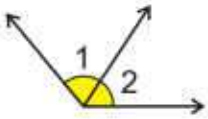
g) Which of the following is not the net of a cube?

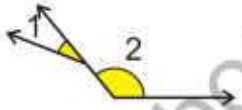
i)  ii)  iii)  iv) 

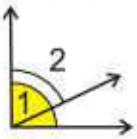
h) The order of the rotational symmetry of the shape  is:

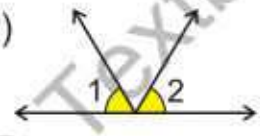
i) 1 ii) 2 iii) 3 iv) 4

i) Which of the following is showing adjacent angles?

i) 

ii) 

iii) 

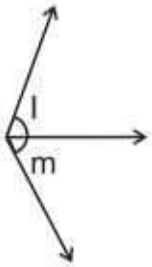
iv) 

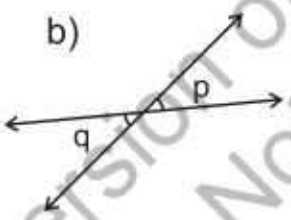
2. Draw these angles by using protractor and ruler.

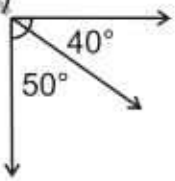
a) 35° b) 45° c) 240° d) 180°

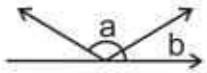
e) 90° f) 60° g) 300° h) 155°

3. Identify the adjacent angles.

a) 

b) 

c) 

d) 

4. Make 5 pairs of each complementary and supplementary angles.

Complementary Angles	Supplementary Angles
a) _____ + _____ = _____	a) _____ + _____ = _____
b) _____ + _____ = _____	b) _____ + _____ = _____
c) _____ + _____ = _____	c) _____ + _____ = _____
d) _____ + _____ = _____	d) _____ + _____ = _____
e) _____ + _____ = _____	e) _____ + _____ = _____

5. How many types of triangles are there with respect to their sides and angles?

6. Draw a triangle IJK in which, $\angle I = 70°$, IJ = 6.8 cm and $\angle J = 28°$.

7. Draw a triangle PQR in which, QR = 3.3cm, PQ = 5.2 cm and $\angle PQR = 75°$.

8. Draw squares according to the given lengths with the help of protractor and ruler.

a) 4 cm b) 5.1 cm c) 3.6 cm d) 4.9 cm

9. Draw rectangles with the help of protractor and ruler according to the given lengths and widths.

a) ℓ= 4 cm, w = 3.4 cm b) ℓ = 5 cm, w = 3 cm

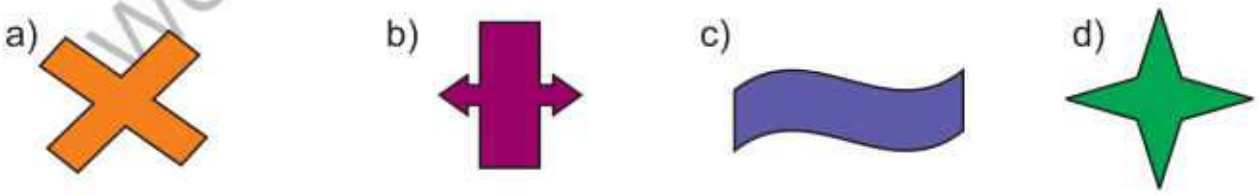
c) ℓ = 6.6 cm, w = 4.2 cm d) ℓ = 7 cm, w = 2.4 cm

10. Encircle the figures which have reflective symmetry. Also draw their line of symmetry.

a) b) c) d)

11. Encircle the figures having rotational symmetry. Also write the order of their rotation and mark their centre of rotation.

a) b) c) d)



12. Use cardboard to make nets of various solids. Also write the number of their faces and the shape. Then fold them and verify whether you have created the correct net or not.