Session: 2024-2025

ASSIGNMENT: MATHEMATICS

<u>FORMATIVE ASSESSMENT-II</u>

CLASS: 6TH

Chapter 4 Basic Geometrical Ideas

Exercise 4.1

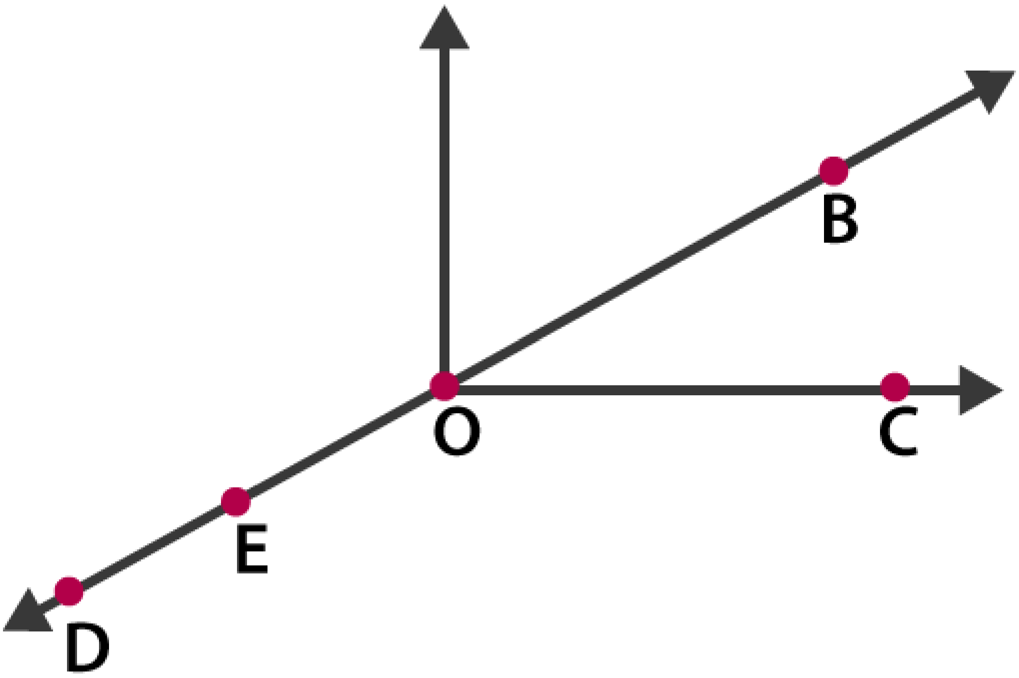
1. Use the figure to name:

(a) Five points

(b) A line

(c) Four rays

(d) Five line segments



Solutions:

(a) The five points are D, E, O, B and C

(b) A line is $\overleftrightarrow{BD}$

(c) Four rays are $\overrightarrow{OD}$, $\overrightarrow{OB}$, $\overrightarrow{OC}$and $\overrightarrow{OE}$.

(d) Five line segments are $\overline{DE}$, $\overline{EO}$, $\overline{OB}$,$\overline{OC}$and $\overline{BE}$

2. Name the line given in all possible (twelve) ways, choosing only two letters at a time from the four given.

Solutions:

The lines are $\overleftrightarrow{AB}$, $\overleftrightarrow{AC}$, $\overleftrightarrow{AD}$, $\overleftrightarrow{BA}$, $\overleftrightarrow{BC}$, $\overleftrightarrow{BD}$, $\overleftrightarrow{CA}$, $\overleftrightarrow{CB}$, $\overleftrightarrow{CD}$, $\overleftrightarrow{DA}$, $\overleftrightarrow{DB}$, $\overleftrightarrow{DC}$

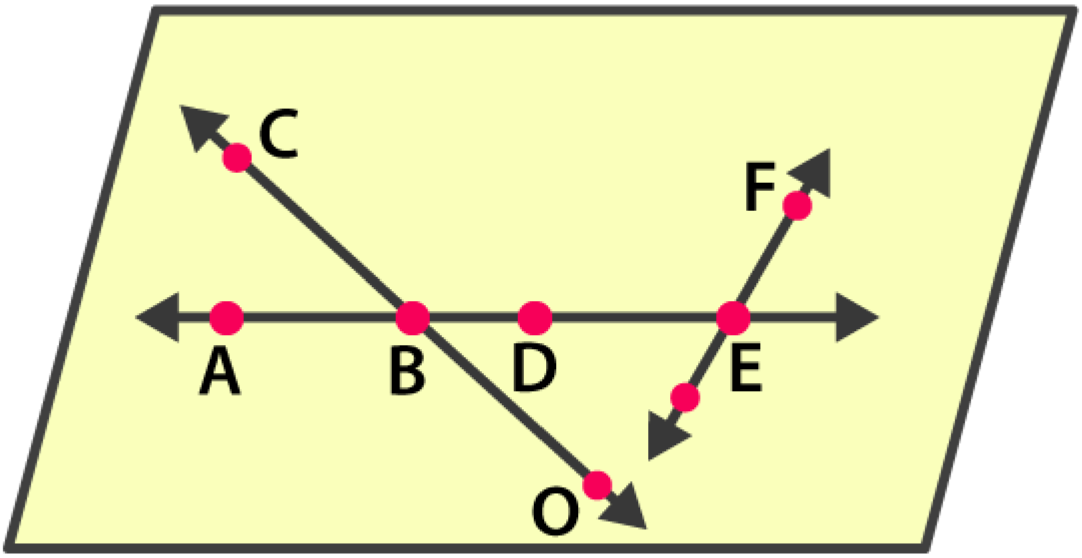
3. Use the figure to name:

(a) Line containing point E.

(b) Line passing through A.

(c) Line on which O lies

(d) Two pairs of intersecting lines.



Solutions:

(a) Line containing point E is $\overleftrightarrow{AE}$

(b) Line passing through A is $\overleftrightarrow{AE}$

(c) Line on which O lies is $\overleftrightarrow{OC}$

(d) Two pairs of intersecting lines are $\overleftrightarrow{CO}$, $\overleftrightarrow{AE}$and $\overleftrightarrow{AE}$, $\overleftrightarrow{EF}$

4. How many lines can pass through (a) one given point? (b) two given points?

Solutions:

(a) Countless lines can pass through a given point.

(b) Only one line can pass through two given points.

5. Draw a rough figure and label suitably in each of the following cases:

(a) Point P lies on $\overline{AB}$ **.**

(b) $\overleftrightarrow{XY}$ **and** $\overleftrightarrow{PQ}$ **intersect at M.**

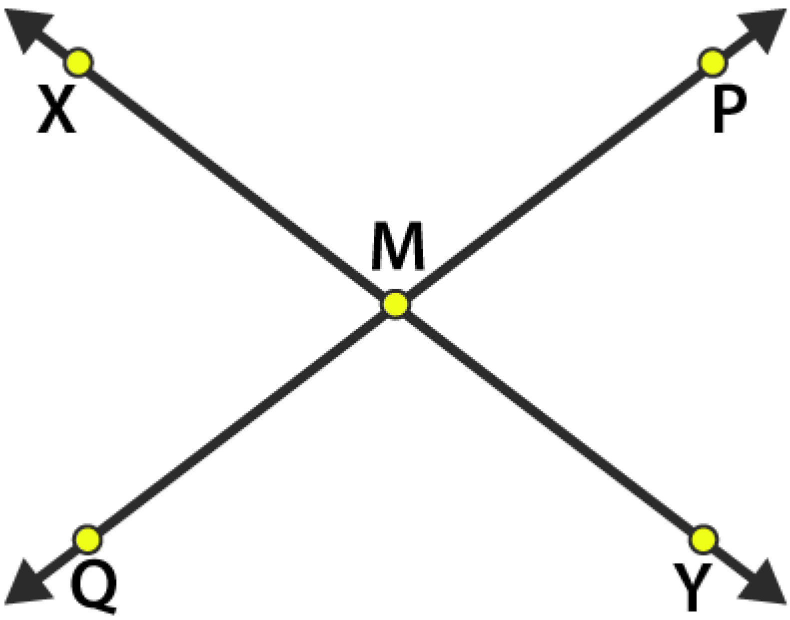
(c) Line l contains E and F but not D.

(d) $\overleftrightarrow{OP}$ **and** $\overleftrightarrow{OQ}$ **meet at O.**

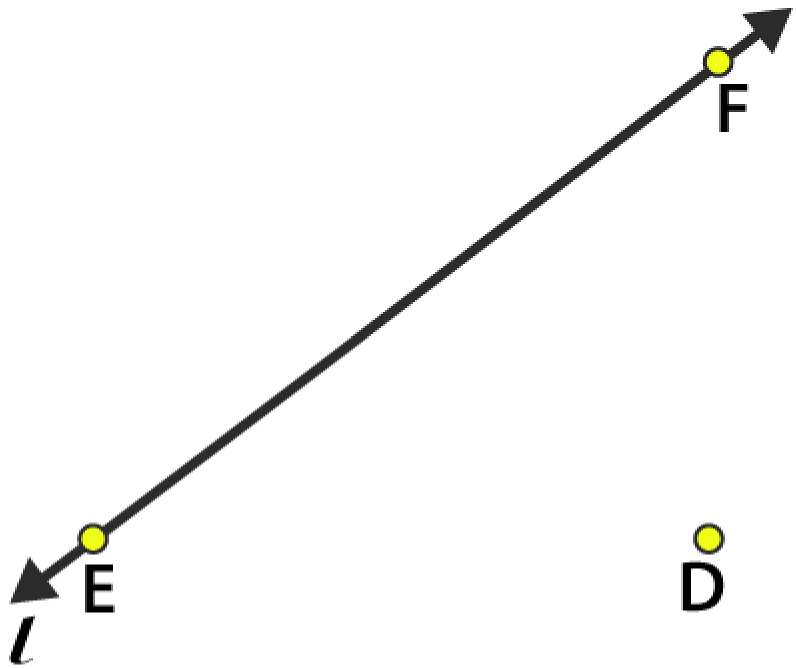
Solutions:

(a)

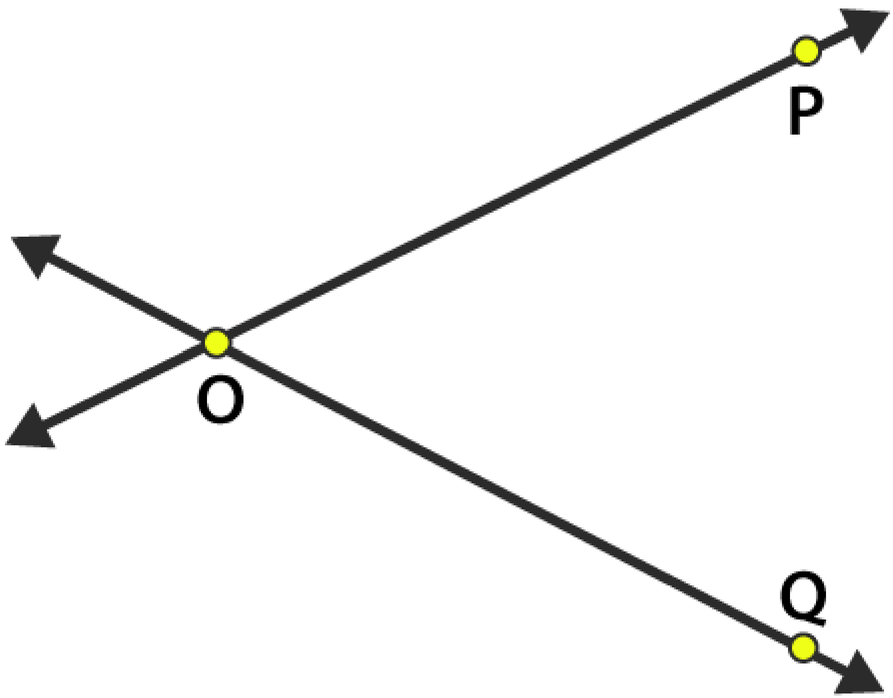
(b)



(c)



(d)



6. Consider the following figure of line $\overleftrightarrow{MN}$. Say whether following statements are true or false in context of the given figure.

(a) Q, M, O, N, P are points on the line $\overleftrightarrow{MN}$.

(b) M, O, N are points on a line segment $\overline{MN}$.

(c) M and N are end points of line segment$\overline{MN}$.

(d) O and N are end points of line segment $\overline{OP}$.

(e) M is one of the end points of line segment $\overline{QO}$.

(f) M is point on ray $\overrightarrow{OP}$.

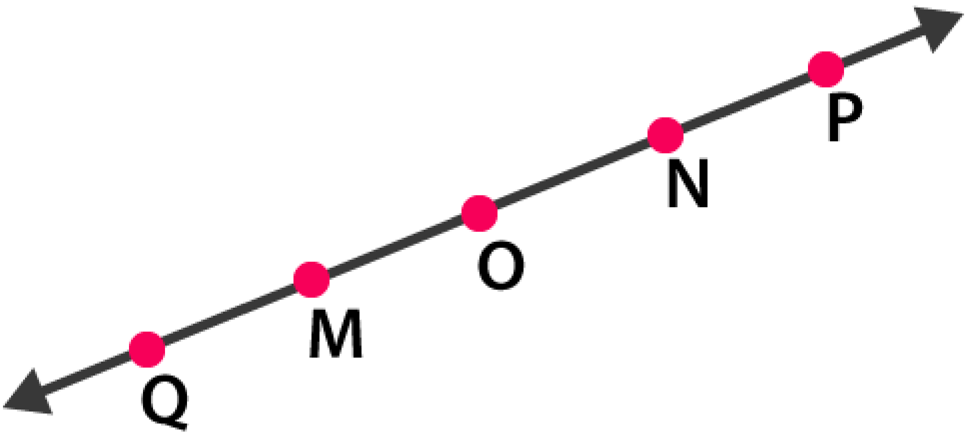
(g) Ray
$\overrightarrow{OP}$ is different from ray$\overrightarrow{QP}$.

(h) Ray $\overrightarrow{OP}$ is same as ray$\overrightarrow{OM}$.

(i) Ray $\overrightarrow{OM}$ is not opposite to ray $\overrightarrow{OP}$.

(j) O is not an initial point of $\overrightarrow{OP}$

(k) N is the initial point of $\overrightarrow{NP}$ and $\overrightarrow{NM}$.



Solutions:

(a) True

(b) True

(c) True

(d) False

(e) False

(f) False

(g) True

(h) False

(i) False

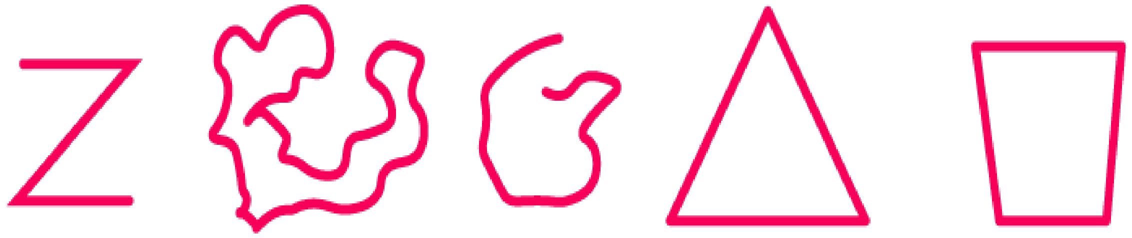
(j) False

(k) True

Exercise 4.2

1. Classify the following curves as

(i) Open or (ii) Closed



(a) (b) (c) (d) (e)

Solutions:

(a) The given curve is an open curve

(b) The given curve is a closed curve

(c) The given curve is an open curve

(d) The given curve is a closed curve

(e) The given curve is a closed curve

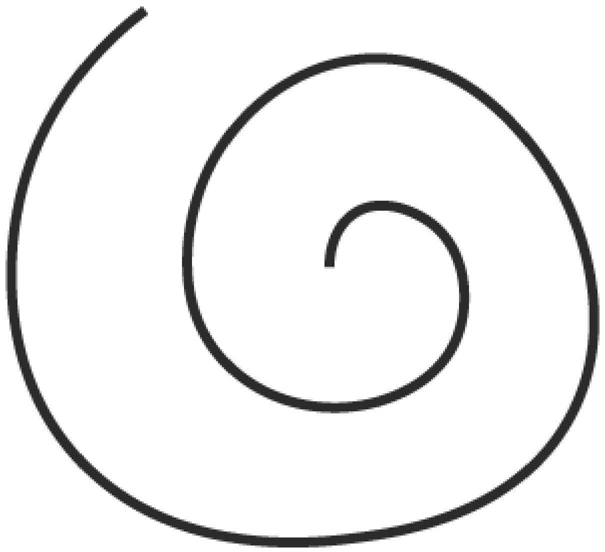
2. Draw rough diagrams to illustrate the following:

(a) Open curve

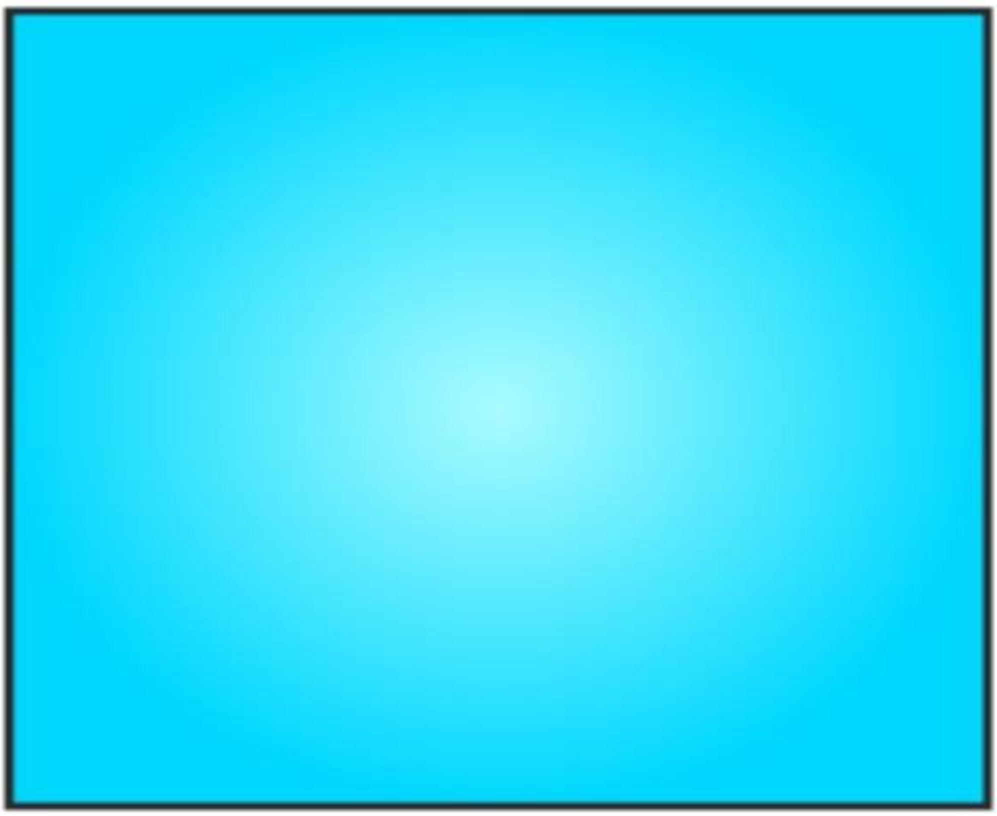
(b) Closed curve

Solutions

(a) The below figure is an open curve



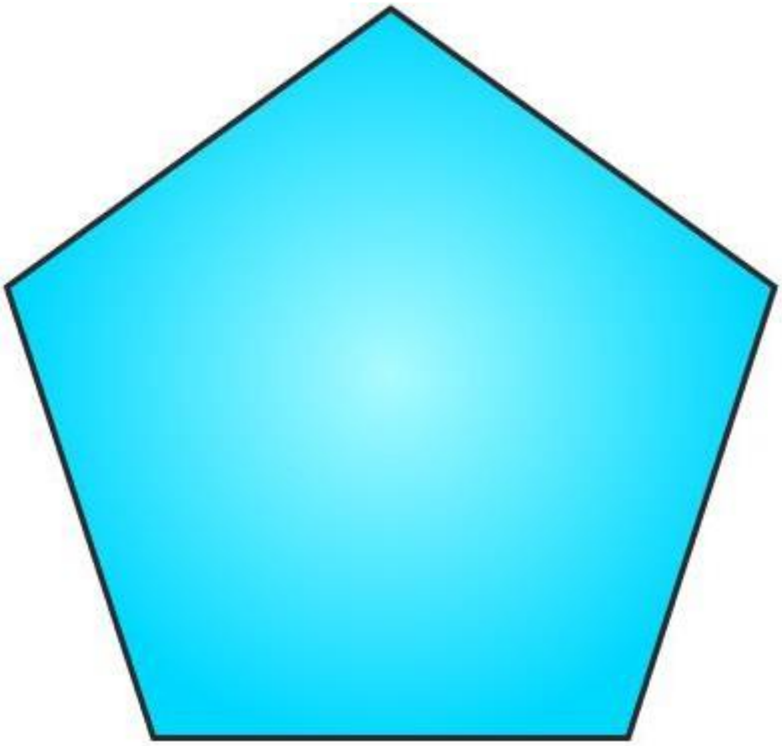
(b) The below figure is a closed curve



3. Draw any polygon and shade its interior.

Solutions:

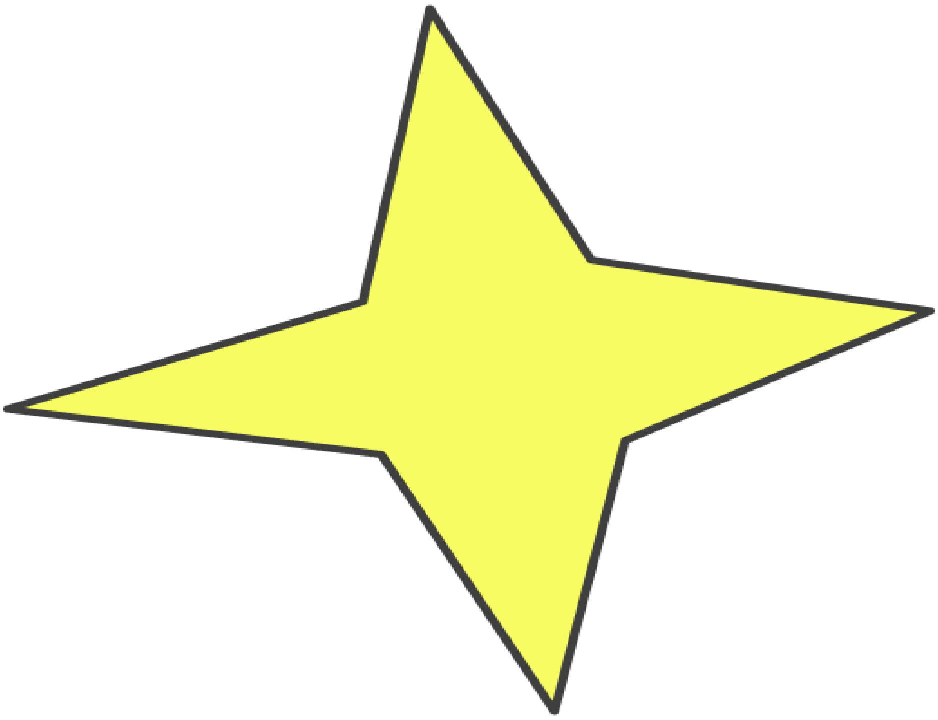
The below figure is a polygon with a shaded interior.



4. Consider the given figure and answer the questions:

(a) Is it a curve?

(b) Is it closed?



Solutions:

(a) Yes, it is a curve

(b) Yes, it is a closed curve

5. Illustrate, if possible, each one of the following with a rough diagram:

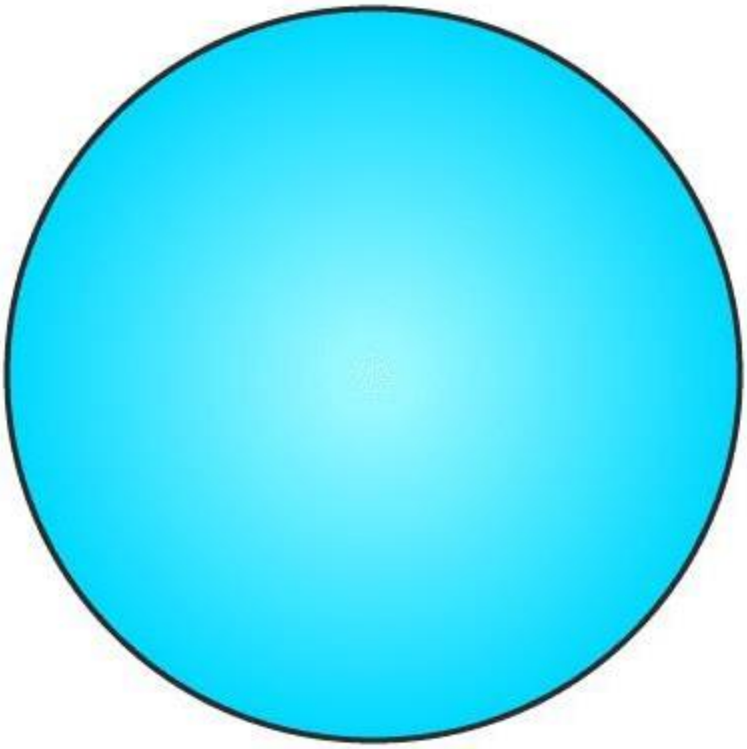
(a) A closed curve that is not a polygon.

(b) An open curve made up entirely of line segments.

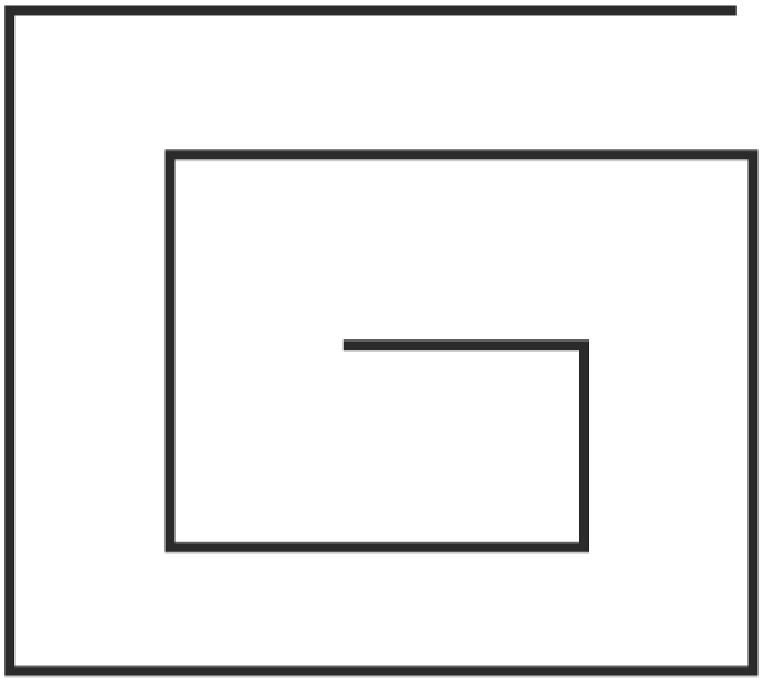
(c) A polygon with two sides.

Solutions:

(a) The below figure is a closed figure but not a polygon.



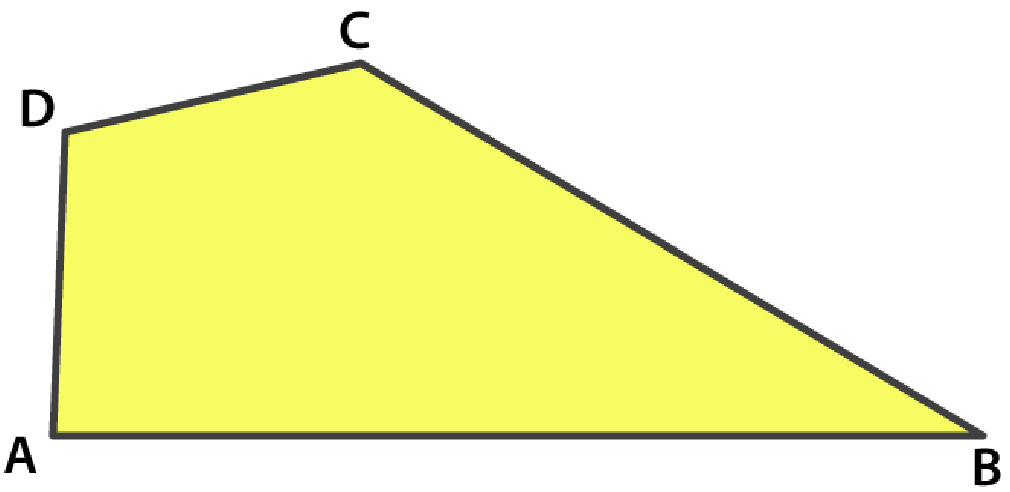
(b) The below figure is an open curve made up entirely of line segments.



(c) No, it's not possible, as the polygon with the least number of sides is a triangle, which has three sides.

Exercise 4.3

1. Name the angles in the given figure.



Solutions:

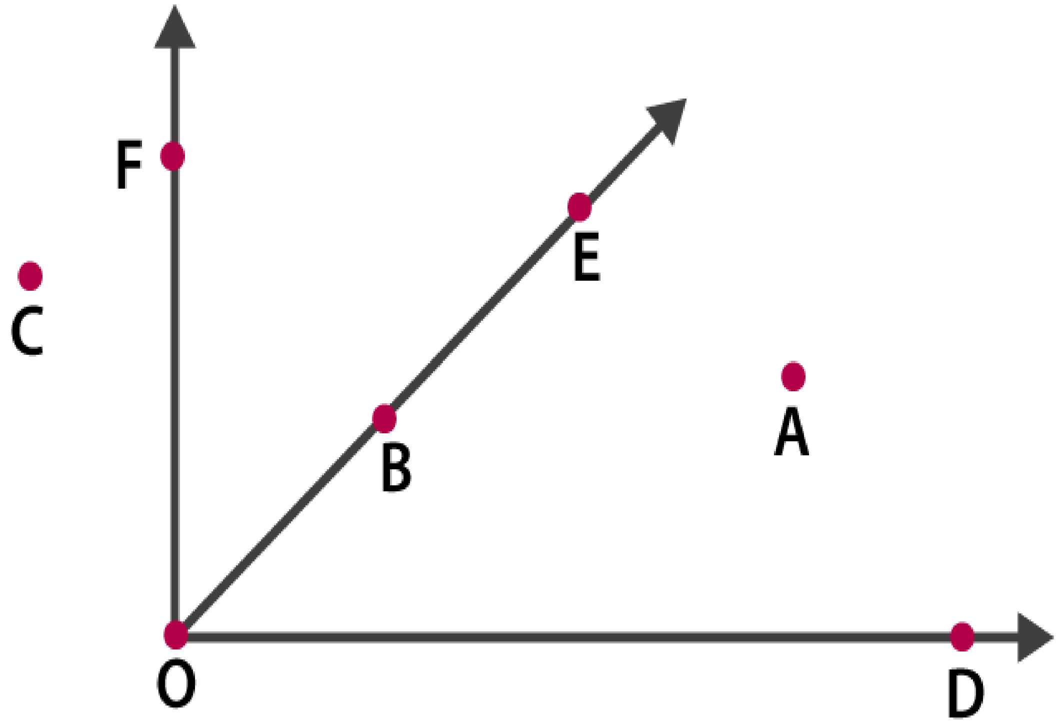
The angles are ∠DAB, ∠ABC, ∠BCD and ∠CDA

2. In the given diagram, name the points(s)

(a) In the interior of ∠DOE

(b) In the exterior of ∠EOF

(c) On ∠EOF



Solutions:

(a) The point in the interior of ∠DOE is A

(b) The points in the exterior of ∠EOF is C, A and D

(c) The points on ∠EOF are E, B, O and F

3. Draw rough diagrams of two angles such that they have

(a) One point in common

(b) Two points in common

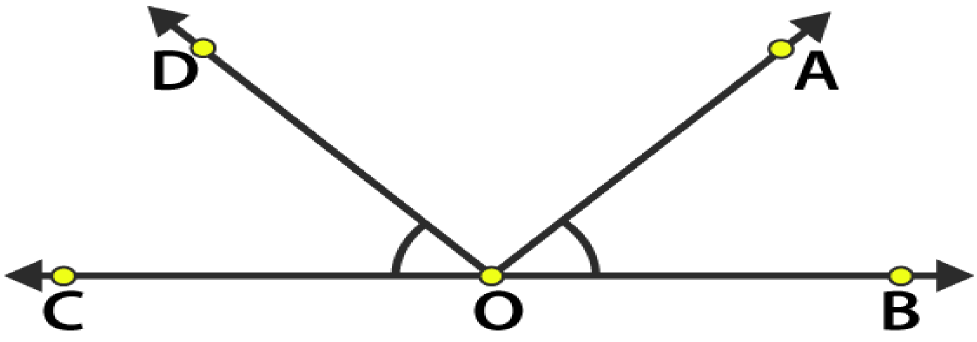
(c) Three points in common

(d) Four points in common

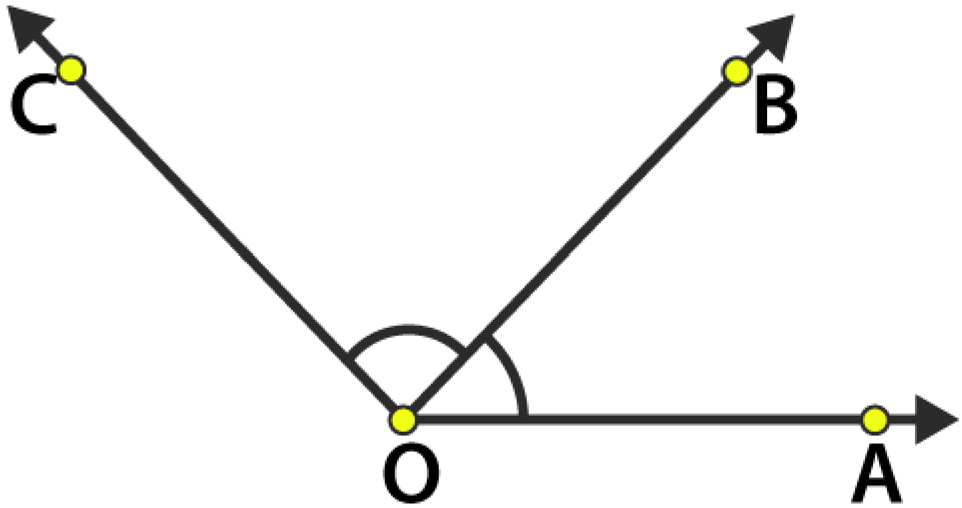
(e) One ray in common

Solutions:

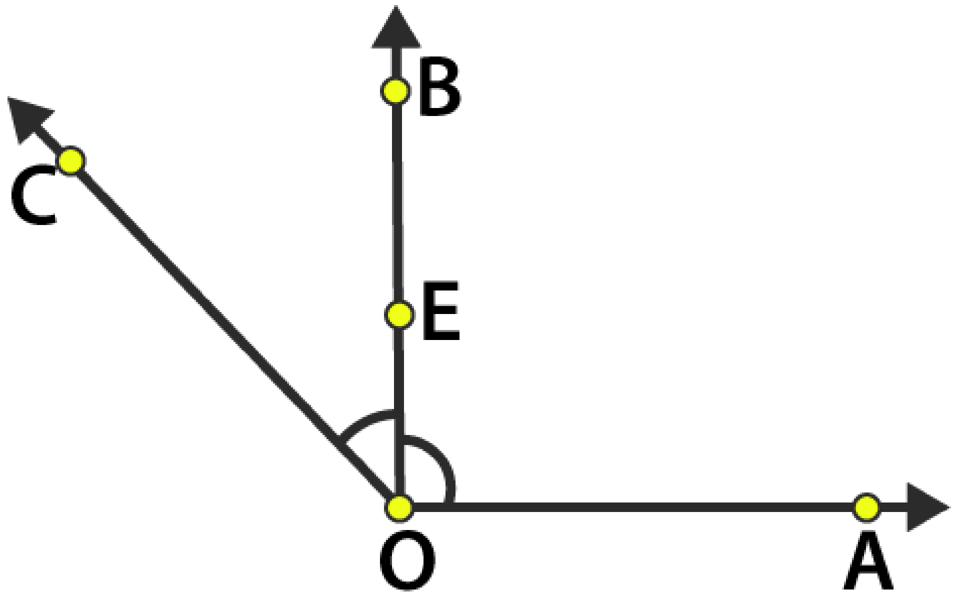
(a) O is the common point between ∠COD and ∠AOB



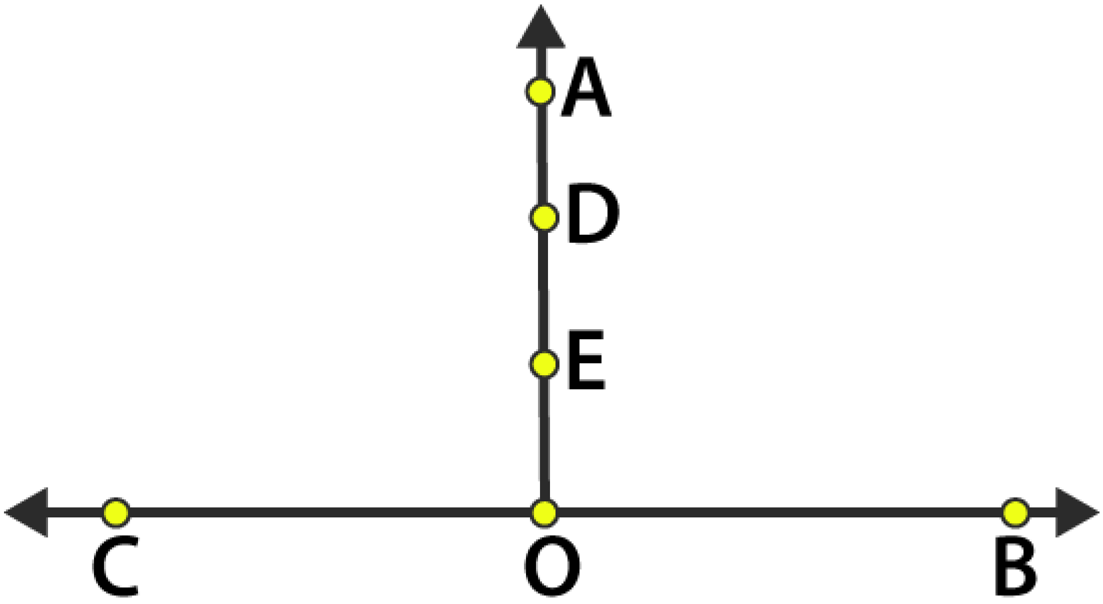
(b) O and B are common points between ∠AOB and ∠BOC



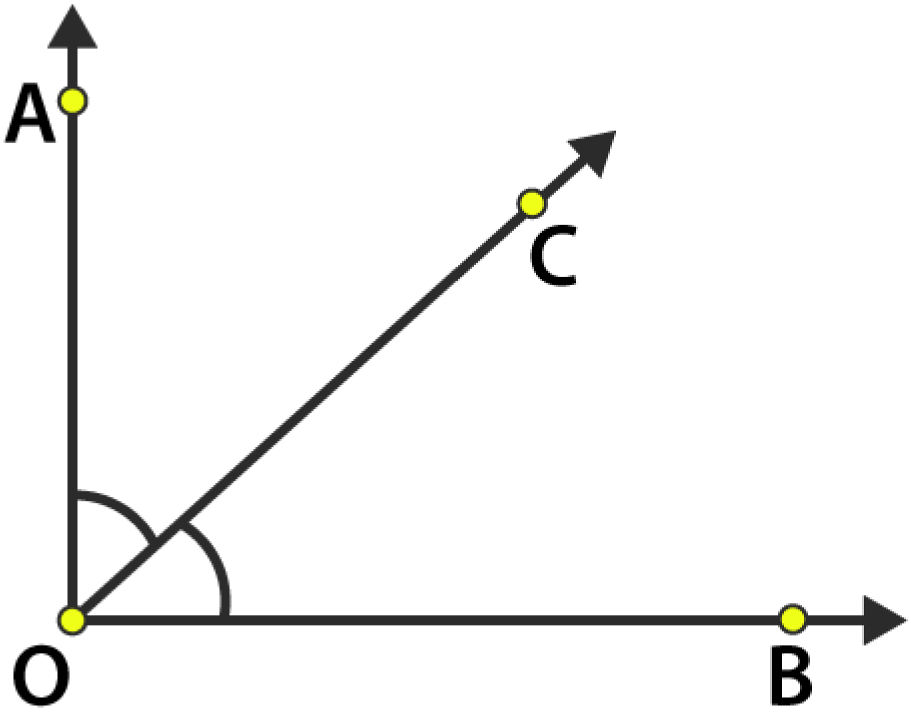
(c) O, E and B are common points between ∠AOB and ∠BOC



(d) O, E, D and A are common points between ∠BOA and ∠COA



(e) OC is a common ray between ∠BOC and ∠AOC

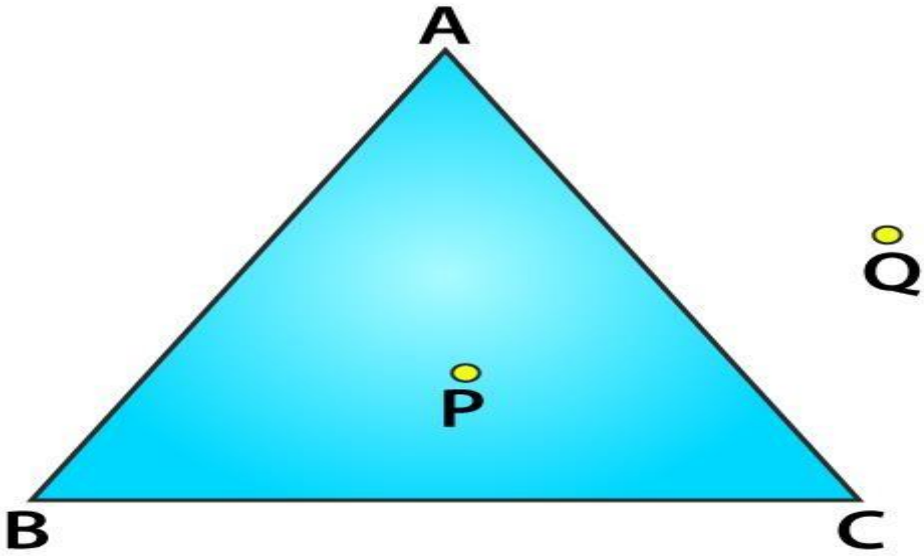


Exercise 4.4

1. Draw a rough sketch of a triangle ABC. Mark a point P in its interior and a point Q in its exterior. Is the point A in its exterior or in its interior?

Solutions:

Point A lies on the given triangle ABC. It lies neither in the interior nor the exterior.

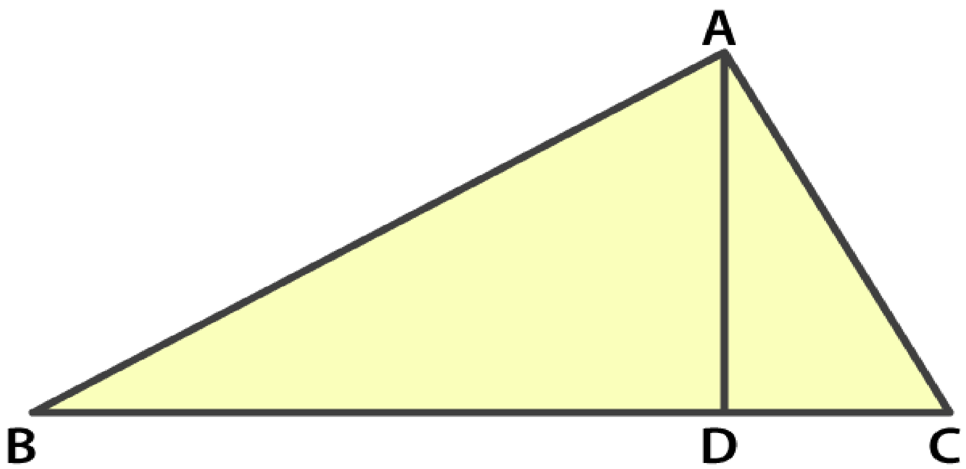


2. (a) Identify three triangles in the figure.

(b) Write the names of seven angles.

(c) Write the names of six line segments

(d) Which two triangles have ∠B as common?



Solutions:

(a) The three triangles are ∠ABD, ∠ACB, ∠ADC

(b) The angles are ∠BAC, ∠BAD, ∠CAD, ∠ADB, ∠ADC, ∠ABC, ∠ACB

(c) The line segments are $\overline{AB}$, $\overline{AC}$, $\overline{BC}$, $\overline{AD}$, $\overline{BD}$, $\overline{DC}$

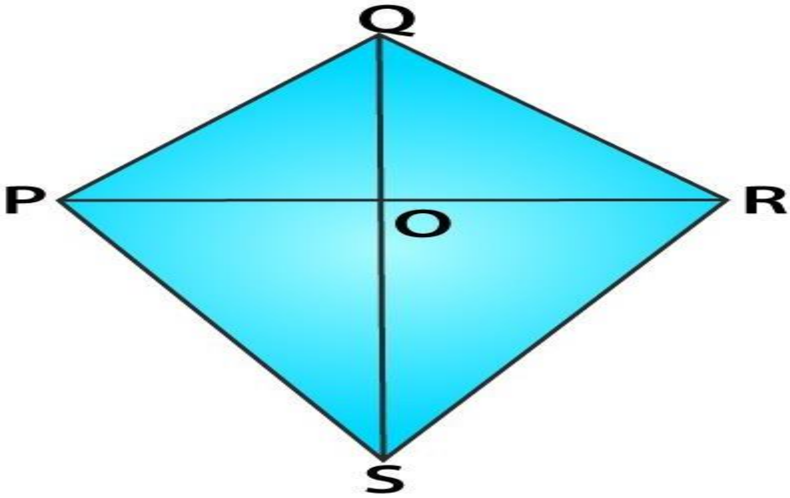
(d) ∠ABD and ∠ABC are triangles which have ∠B as common.

Exercise 4.5

1. Draw a rough sketch of a quadrilateral PQRS. Draw its diagonals. Name them. Is the meeting point of the diagonals in the interior or exterior of the quadrilateral?

Solutions:

PR and QS are the diagonals**.** They meet at point O, which is in the interior of the quadrilateral.



2. Draw a rough sketch of a quadrilateral KLMN. State,

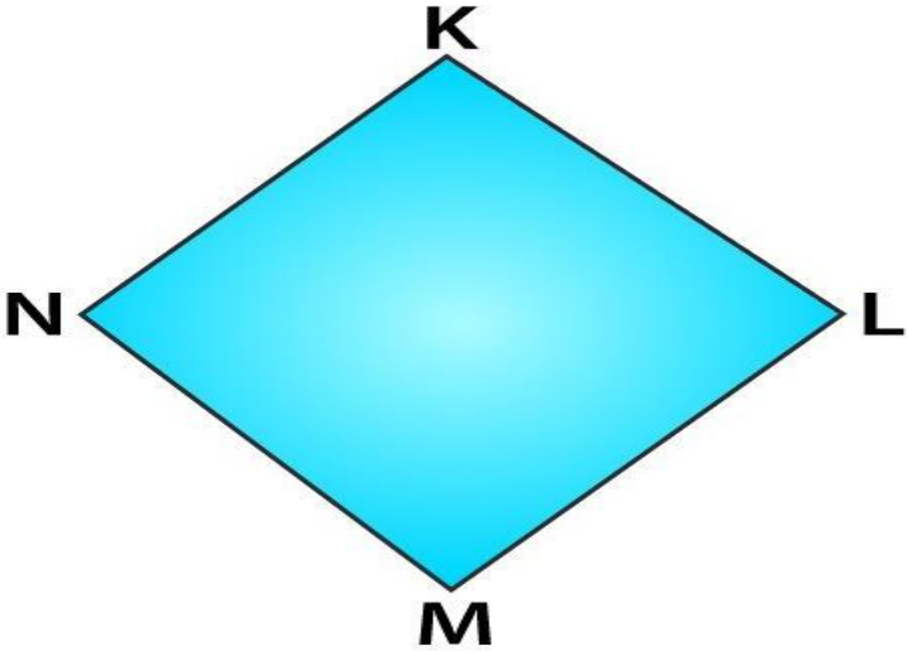
(a) two pairs of opposite sides,

(b) two pairs of opposite angles,

(c) two pairs of adjacent sides,

(d) two pairs of adjacent angles.

Solutions:



(a) Two pairs of opposite sides are
$\overline{KL}$, $\overline{NM}$ and $\overline{KN}$, $\overline{ML}$

(b) Two pairs of opposite angles are ∠KLM, ∠KNM and ∠LKN, ∠LMN

(c) Two pairs of adjacent sides are
$\overline{KL}$, $\overline{KN}$ and $\overline{NM}$, $\overline{ML}$ or $\overline{KL}$, $\overline{LM}$ and $\overline{NM}$, $\overline{NK}$

(d) Two pairs of adjacent angles are ∠K, ∠L and ∠M, ∠N or ∠K, ∠L and ∠L, ∠M

Exercise 4.6

1. From the figure, identify:

(a) the centre of circle

(b) three radii

(c) a diameter

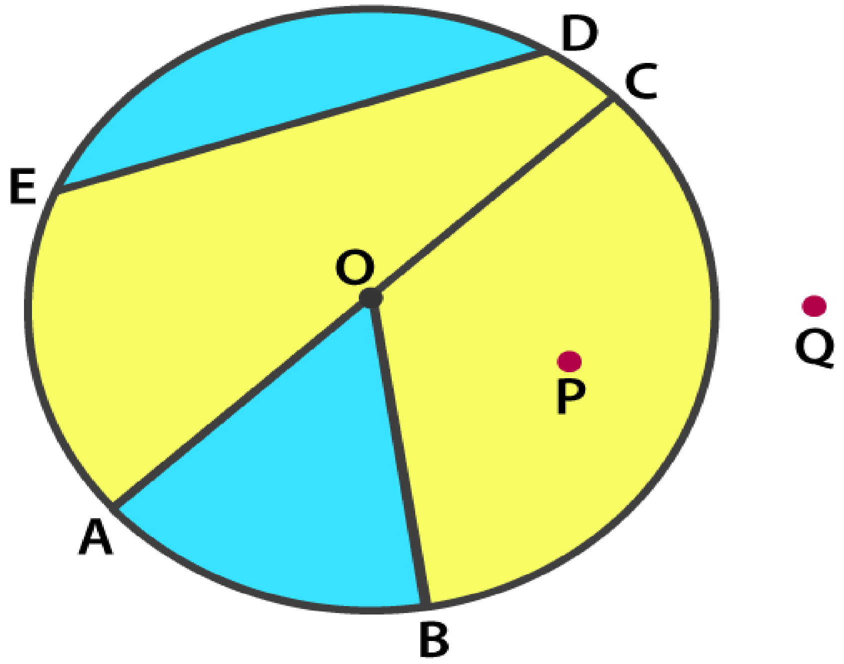
(d) a chord

(e) two points in the interior

(f) a point in the exterior

(g) a sector

(h) a segment



Solutions:

(a) The centre of the circle is O

(b) Three radii are $\overline{OA}$, $\overline{OB}$, $\overline{OC}$

(c) A diameter is $\overline{AC}$

(d) A chord is $\overline{ED}$

(e) Two points in the interior are O and P

(f) A point in the exterior is Q

(g) A sector is AOB, i.e., shaded region

(h) A segment is ED, i.e., shaded region

2. (a) Is every diameter of a circle also a chord?

(b) Is every chord of a circle also a diameter?

Solutions:

(a) Yes, every diameter of a circle is also a chord. The diameter is also called the longest chord.

(b) No, every chord is not a diameter.

3. Draw any circle and mark

(a) its centre

(b) a radius

(c) a diameter

(d) a sector

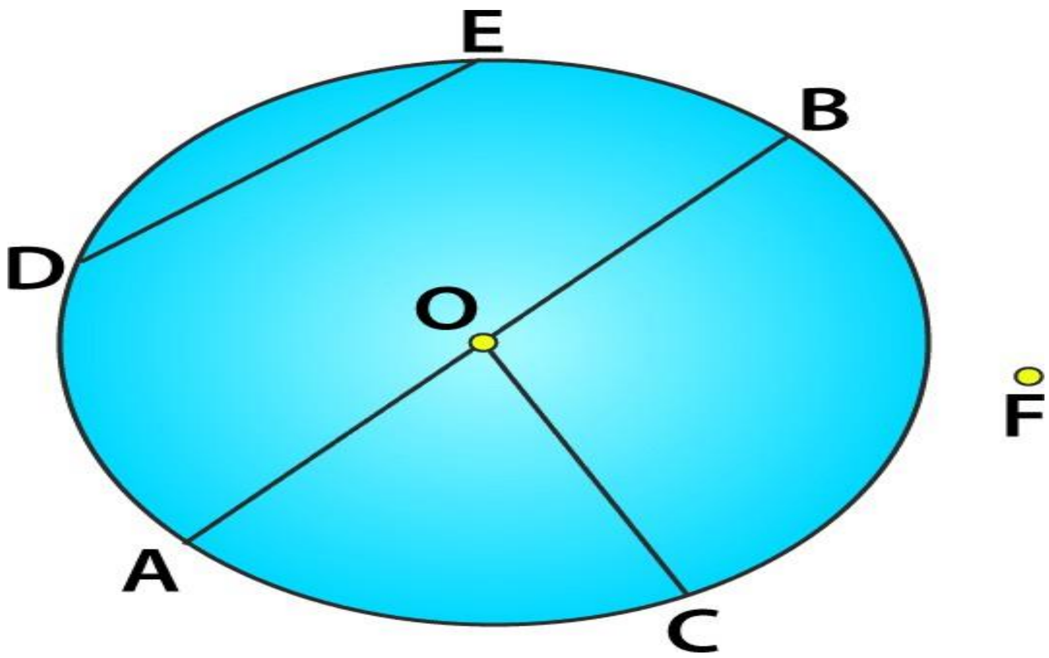
(e) a segment

(f) a point in its interior

(g) a point in its exterior

(h) an arc

Solutions:



(a) The centre of the circle is O.

(b) The radius is OC

(c) A diameter is $\overline{AB}$

(d) A sector is AOC

(e) A segment is DE

Chapter 5 understanding elementary shapes

Exercise 5.1

1) **Why is it better to use a divider than a ruler, while measuring the length of a line segment?**

Solutions:

While using a ruler, chances of error occur due to thickness of the ruler and angular viewing. Hence, using divider accurate measurement is possible.

2) **Draw any line segment, say $\overline{AB}$. Take any point C lying in between A and B. Measure the lengths of AB, BC and AC. Is AB = AC + CB?**

Solutions:

Since given that point C lie in between A and B. Hence, all points are lying on same line segment
$\overline{AB}$. Therefore for every situation in which point C is lying in between A and B we may say that

AB = AC + CB

For example:

AB is a line segment of length 7 cm and C is a point between A and B such that AC = 3 cm and CB = 4 cm.

Hence, AC + CB = 7 cm

Since, AB = 7 cm

∴ AB = AC + CB is verified.

3) **If A, B, C are three points on a line such that AB = 5 cm, BC = 3 cm and AC = 8 cm, which one of them lies between the other two?**

Solutions:

Given AB = 5 cm

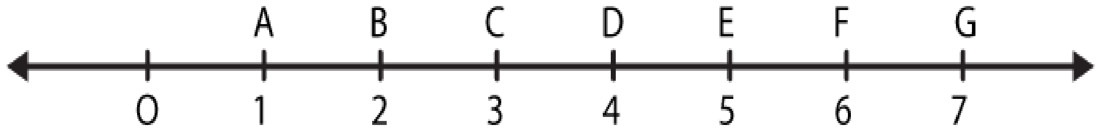
BC = 3 cm

AC = 8 cm

Now, it is clear that AC = AB + BC

Hence, point B lies between A and C.

4) Verify whether D is the mid point of $\overline{AG}$.



Solutions:

Since, it is clear from the figure that AD = DG = 3 units. Hence, D is the midpoint of $\overline{AG}$

5) If B is the mid point of $\overline{AC}$ and C is the mid point of $\overline{BD}$, where A, B, C, D lie on a straight line, say why AB = CD?

Solutions:

Given

B is the midpoint of AC. Hence, AB = BC (1)

C is the midpoint of BD. Hence, BC = CD (2)

From (1) and (2)

AB = CD is verified

Exercise 5.2

1. What fraction of a clockwise revolution does the hour hand of a clock turn through, when it goes from

(a) 3 to 9

(b) 4 to 7

(c) 7 to 10

(d) 12 to 9

(e) 1 to 10

(f) 6 to 3

Solutions:

We know that in one complete clockwise revolution, hour hand will rotate by 360^0

(a) When hour hand goes from 3 to 9 clockwise, it will rotate by 2 right angles or 180^0

∴ Fraction = $180^0 / 360^0$
= 1 / 2

(b) When hour hand goes from 4 to 7 clockwise, it will rotate by 1 right angle or 90^0

∴ Fraction = $90^0 / 360^0$
= 1 / 4

(c) When hour hand goes from 7 to 10 clockwise, it will rotate by 1 right angle or 90^0

∴ Fraction = $90^0 / 360^0$
= 1 / 4

(d) When hour hand goes from 12 to 9 clockwise, it will rotate by 3 right angles or 270^0

∴ Fraction = $270^0 / 360^0$
= 3 / 4

(e) When hour hand of a clock goes from 1 to 10 clockwise, it will rotate by 3 right angles or 270^0

∴ Fraction = $270^0 / 360^0$
= 3 / 4

(f) When hour hand goes from 6 to 3 clockwise, it will rotate by 3 right angles or 270^0

∴ Fraction = $270^0 / 360^0$
= 3 / 4

2. Where will the hand of a clock stop if it

(a) starts at 12 and makes 1 / 2 of a revolution, clockwise?

(b) starts at 2 and makes 1 / 2 of a revolution, clockwise?

(c) starts at 5 and makes 1 / 4 of a revolution, clockwise?

(d) starts at 5 and makes 3 / 4 of a revolution, clockwise?

Solutions:

We know that one complete clockwise revolution, hour hand will rotate by 360^0

(a) When hour hand of a clock starts at 12 and makes 1 / 2 revolution clockwise, it will rotate by 180^0.

Hence, the hour hand of a clock will stop at 6.

(b) When hour hand of a clock starts at 2 and makes 1 / 2 revolution clockwise, it will rotate by 180^0

Hence, the hour hand of a clock will stop at 8.

(c) When hour hand of a clock starts at 5 and makes 1 / 4 revolution clockwise, it will rotate by 90^0

Hence, hour hand of a clock will stop at 8.

(d) When hour hand of a clock starts at 5 and makes 3 / 4 revolution clockwise, it will rotate by 270^0

Hence, hour hand of a clock will stop at 2

3. Which direction will you face if you start facing

(a) east and make 1 / 2 of a revolution clockwise?

(b) east and make 1 ½ of a revolution clockwise?

(c) west and make 3 / 4 of a revolution anti – clockwise?

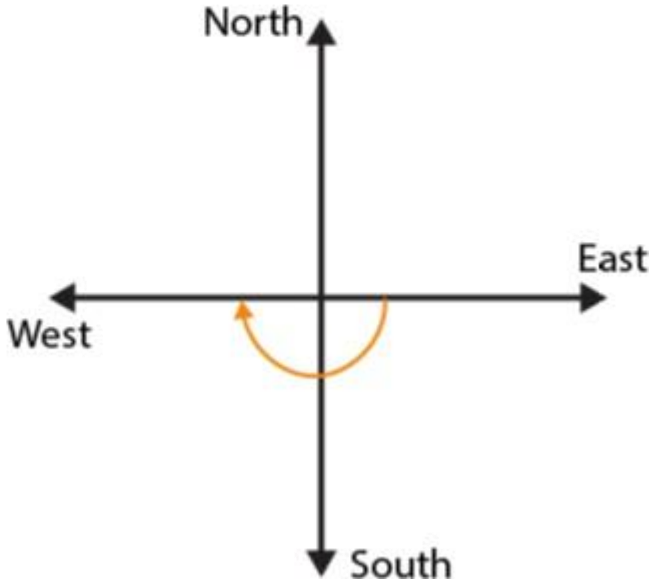
(d) south and make one full revolution?

(should we specify clockwise or anti – clockwise for this last question? Why not?)

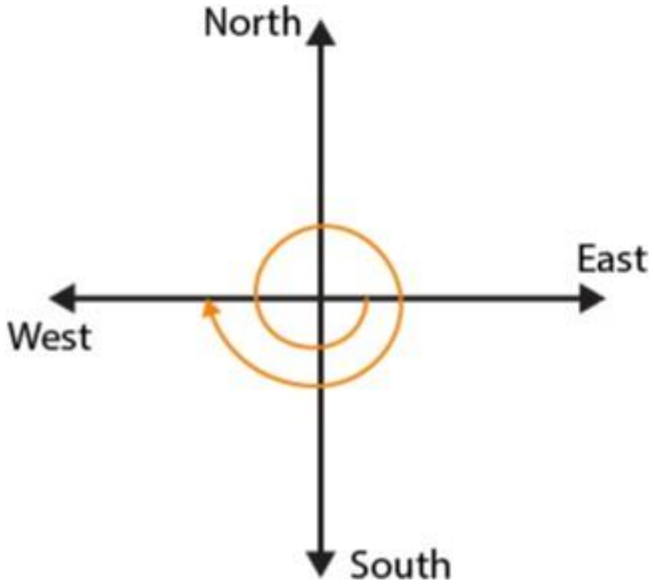
Solutions:

Revolving one complete round in clockwise or in anti – clockwise direction we will revolve by 360^0 and two adjacent directions are at 90^0 or 1 / 4 of a complete revolution away from each other.

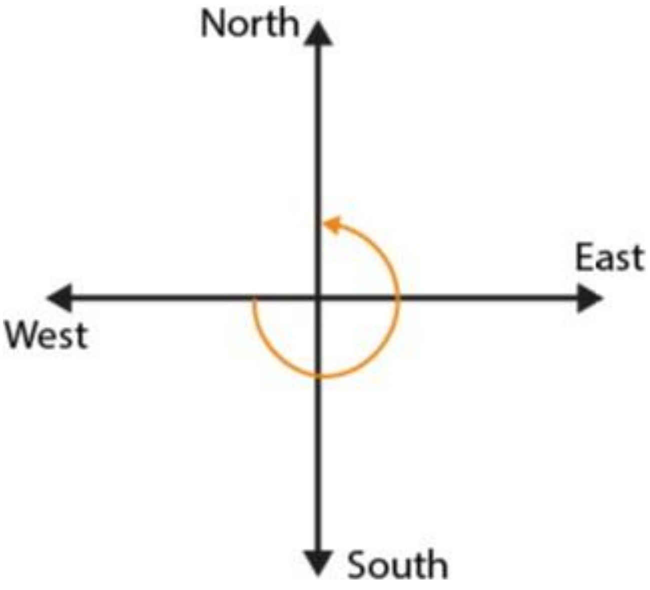
(a) If we start facing towards East and make 1 / 2 of a revolution clockwise, we will face towards West direction.



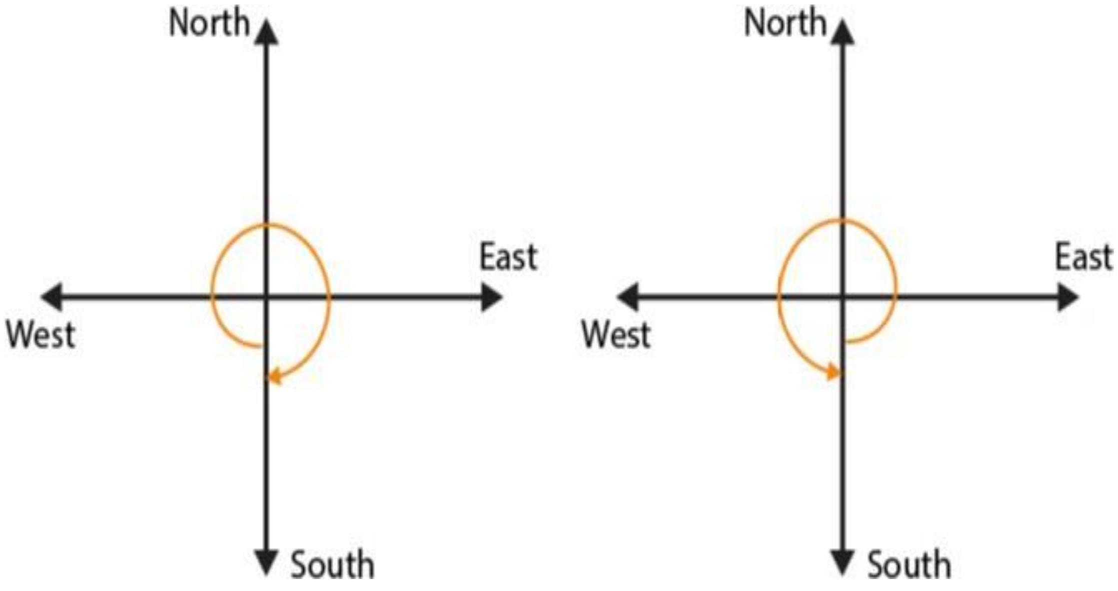
(b) If we start facing towards East and make 1 ½ of a revolution clockwise, we will face towards West direction



(c) If we start facing towards West and make 3 / 4 of a revolution anti – clockwise, we will face towards North direction



(d) If we start facing South and make one full revolution, again we will face the South direction.



In case of revolving 1 complete revolution, either clockwise or anti-clockwise we will be back at the original position.

4. What part of a revolution have you turned through if you stand facing

(a) east and turn clockwise to face north?

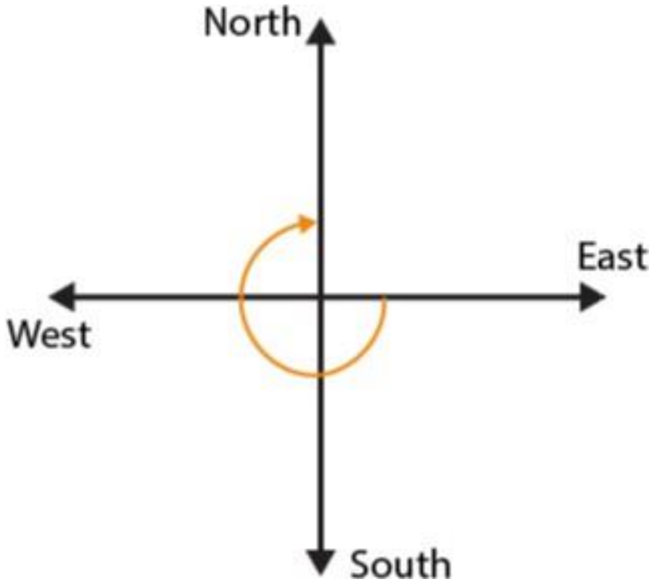
(b) south and turn clockwise to face east

(c) west and turn clockwise to face east?

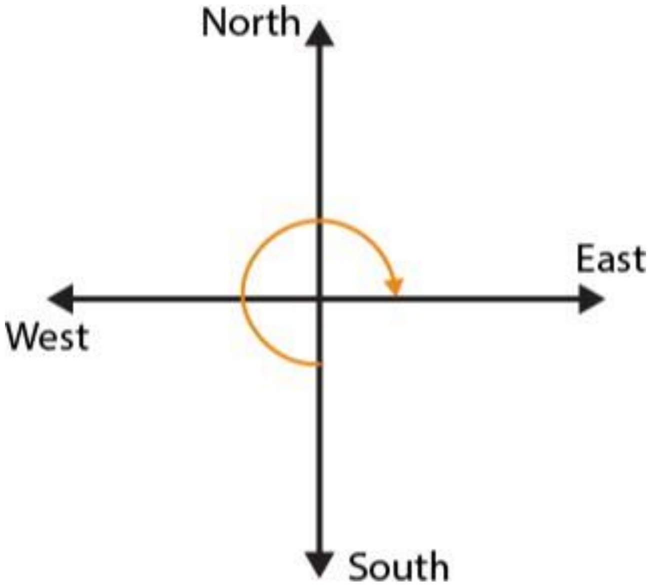
Solutions:

By revolving one complete revolution either in clockwise or in anti-clockwise direction, we will revolve by 360^0 and two adjacent directions are at 90^0 or 1 / 4 of a complete revolution away from each other

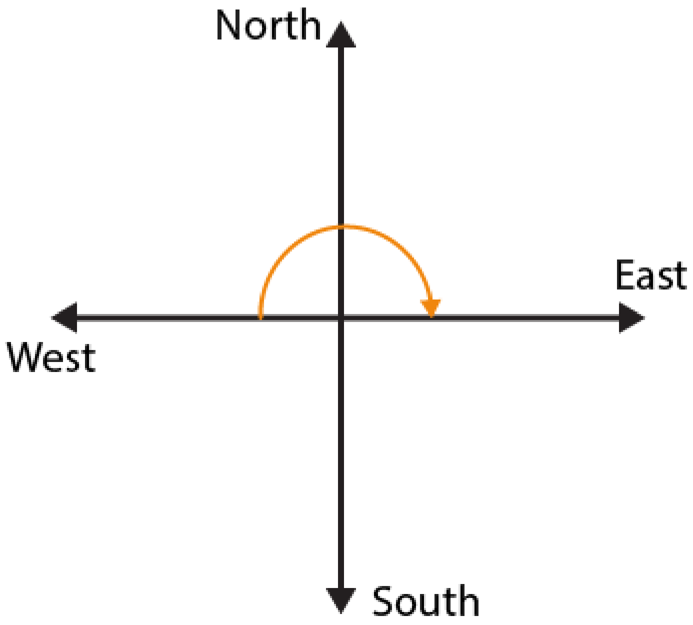
(a) If we start facing towards East and turn clockwise to face North, we have to make 3 / 4 of a revolution



(b) If we start facing towards South and turn clockwise to face East, we have to make 3 / 4 of a revolution



(c) If we start facing towards West and turn clockwise to face East, we have to make 1 / 2 of a revolution



5. Find the number of right angles turned through by the hour hand of a clock when it goes from

(a) 3 to 6

(b) 2 to 8

(c) 5 to 11

(d) 10 to 1

(e) 12 to 9

(f) 12 to 6

Solutions:

The hour hand of a clock revolves by 360^0 or it covers 4 right angles in one complete revolution

(a) If hour hand of a clock goes from 3 to 6, it revolves by 90^0 or 1 right angle

(b) If hour hand of a clock goes from 2 to 8, it revolves by 180^0 or 2 right angles

(c) If hour hand of a clock goes from 5 to 11, it revolves by 180^0 or 2 right angles

(d) If hour hand of a clock goes from 10 to 1, it revolves by 90^0 or 1 right angle

(e) If hour hand of a clock goes from 12 to 9, it revolves by 270^0 or 3 right angles

(f) If hour hand of a clock goes from 12 to 6, it revolves by 180^0 or 2 right angles

6. How many right angles do you make if you start facing

(a) south and turn clockwise to west?

(b) north and turn anti – clockwise to east?

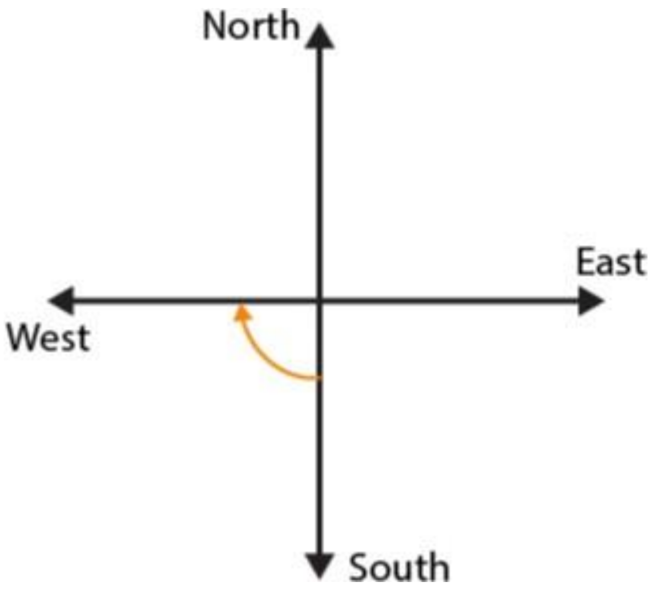
(c) west and turn to west?

(d) south and turn to north?

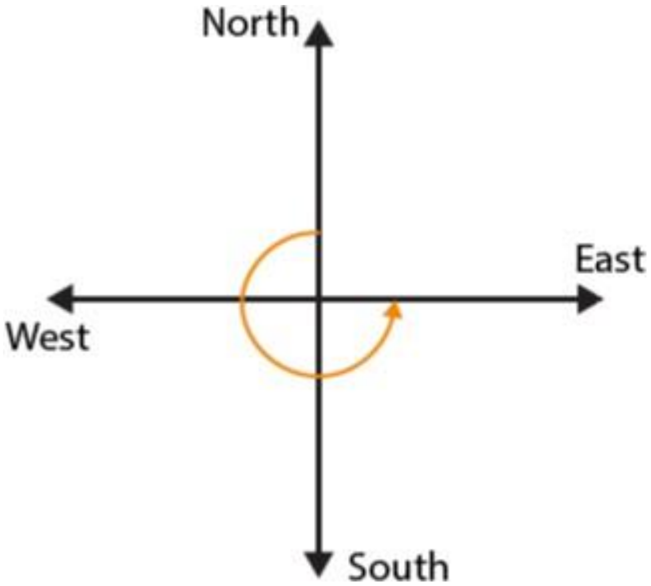
Solutions:

By revolving one complete round in either clockwise or anti-clockwise direction, we will revolve by 360^0 and two adjacent directions are at 90^0 away from each other.

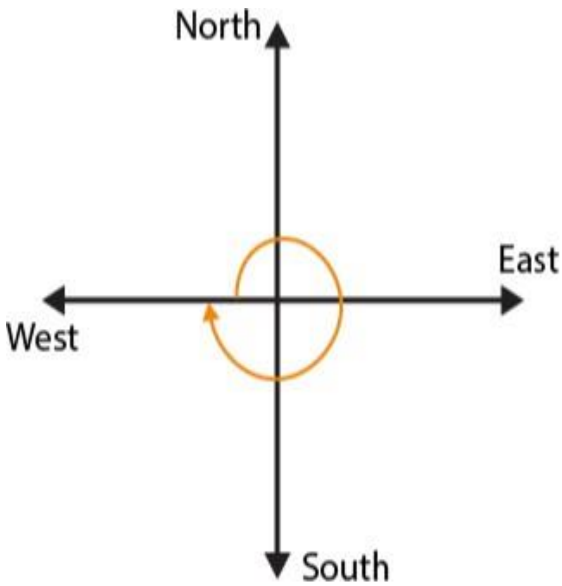
(a) If we start facing towards South and turn clockwise to West, we have to make one right angle

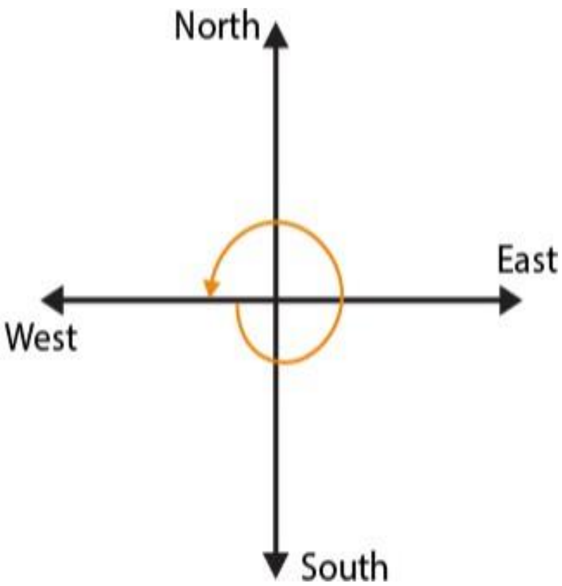


(b) If we start facing towards North and turn anti-clockwise to East, we have to make 3 right angles

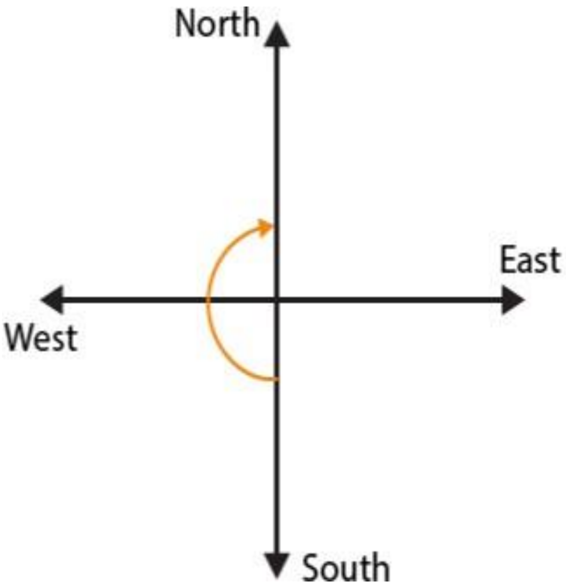


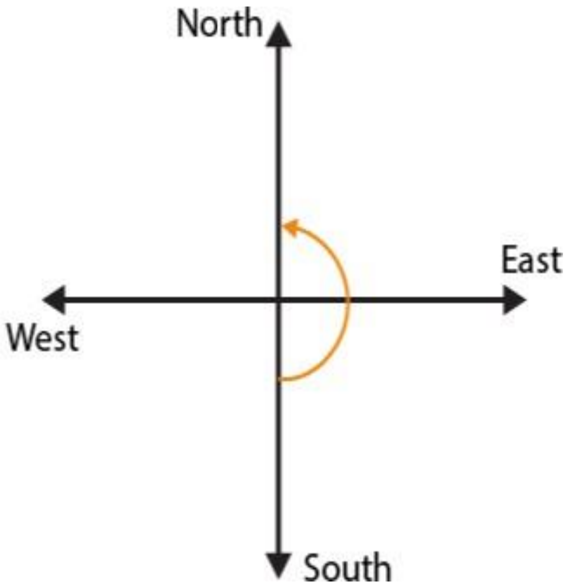
(c) If we start facing towards West and turn to West, we have to make one complete round or 4 right angles





(d) If we start facing towards South and turn to North, we have to make 2 right angles





7. Where will the hour hand of a clock stop if it starts

(a) from 6 and turns through 1 right angle?

(b) from 8 and turns through 2 right angles?

(c) from 10 and turns through 3 right angles?

(d) from 7 and turns through 2 straight angles?

Solutions:

We know that in 1 complete revolution in either clockwise or anticlockwise direction, hour hand of a clock will rotate by 360^0 or 4 right angles

(a) If hour hand of a clock starts from 6 and turns through 1 right angle, it will stop at 9

(b) If hour hand of a clock starts from 8 and turns through 2 right angles, it will stop at 2

(c) If hour hand of a clock starts from 10 and turns through 3 right angles, it will stop at 7

(d) If hour hand of a clock starts from 7 and turns through 2 straight angles, it will stop at 7

Exercise 5.3

1. Match the following:

(i) Straight angle (a) Less than one-fourth of a revolution

(ii) Right angle (b) More than half a revolution

(iii) Acute angle (c) Half of a revolution

(iv) Obtuse angle (d) One-fourth of a revolution

(v) Reflex angle (e) Between 1 / 4 and 1 / 2 of a revolution

(f) One complete revolution

Solutions:

(i) Straight angle = 180^0 or half of a revolution

Hence, (c) is correct answer

(ii) Right angle = 90^0 or one-fourth of a revolution

Hence, (d) is correct answer

(iii) Acute angle = less than 90^0 or less than one-fourth of a revolution

Hence, (a) is correct answer

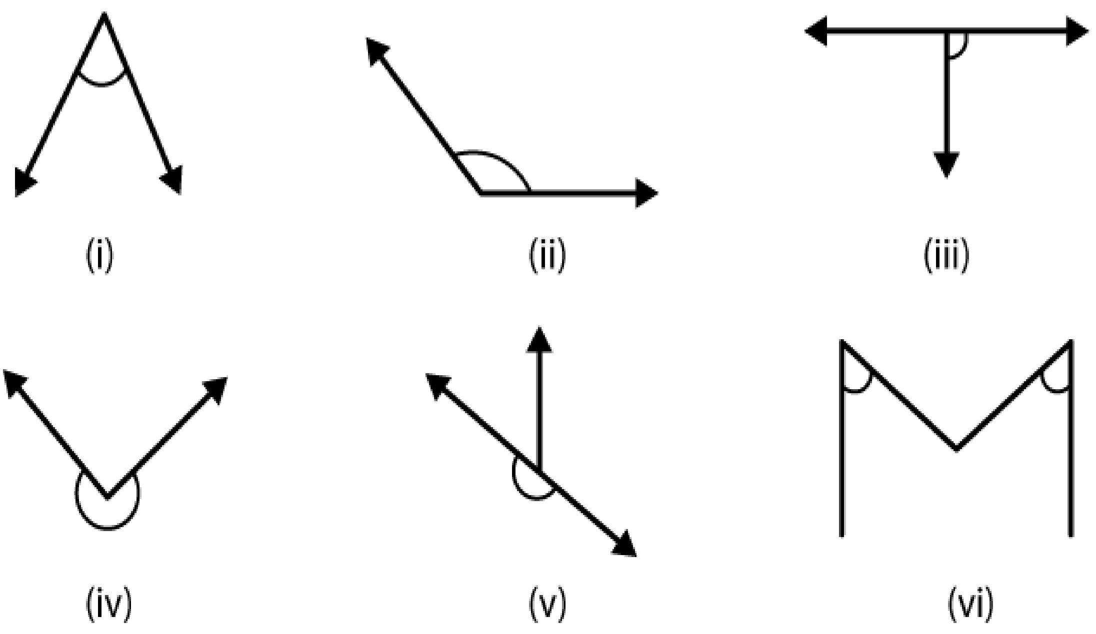
(iv) Obtuse angle = more than 90^0 but less than 180^0 or between 1 / 4 and 1 / 2 of a revolution

Hence, (e) is correct answer

(v) Reflex angle = more than 180^0 but less than 360^0 or more than half a revolution

Hence, (b) is correct answer

2. Classify each one of the following angles as right, straight, acute, obtuse or reflex:



Solutions:

(i) The given angle is acute angle it measures less than 90^0

3

(ii) The given angle is obtuse angle as it measures more than 90^0 but less than 180^0

(iii) The given angle is right angle as it measures 90^0

(iv) The given angle is reflex angle as it measures more than 180^0 but less than 360^0

(v) The given angle is straight angle as it measures 180^0

(vi) The given angle is acute angle as it measures less than 90^0

Exercise 5.4

1. What is the measure of

(i) a right angle

(ii) a straight angle

Solutions:

(i) The measure of a right angle is 90^0

(ii) The measure of a straight angle is 180^0

2. Say True or False:

(a) The measure of an acute angle < 90^0

(b) The measure of an obtuse angle < 90^0

(c) The measure of a reflex angle > 180^0

(d) The measure of one complete revolution = 360^0

(e) If m $\angle A = 53^0$ and m $\angle B = 35^0$, then m $\angle A >$ m $\angle B$.

Solutions:

(a) True, the measure of an acute angle is less than 90^0

(b) False, the measure of an obtuse angle is more than 90^0 but less than 180^0

(c) True, the measure of a reflex angle is more than 180^0

(d) True, the measure of one complete revolution is 360^0

(e) True, $\angle A$ is greater than $\angle B$

3. Write down the measures of

(a) some acute angles

(b) some obtuse angles

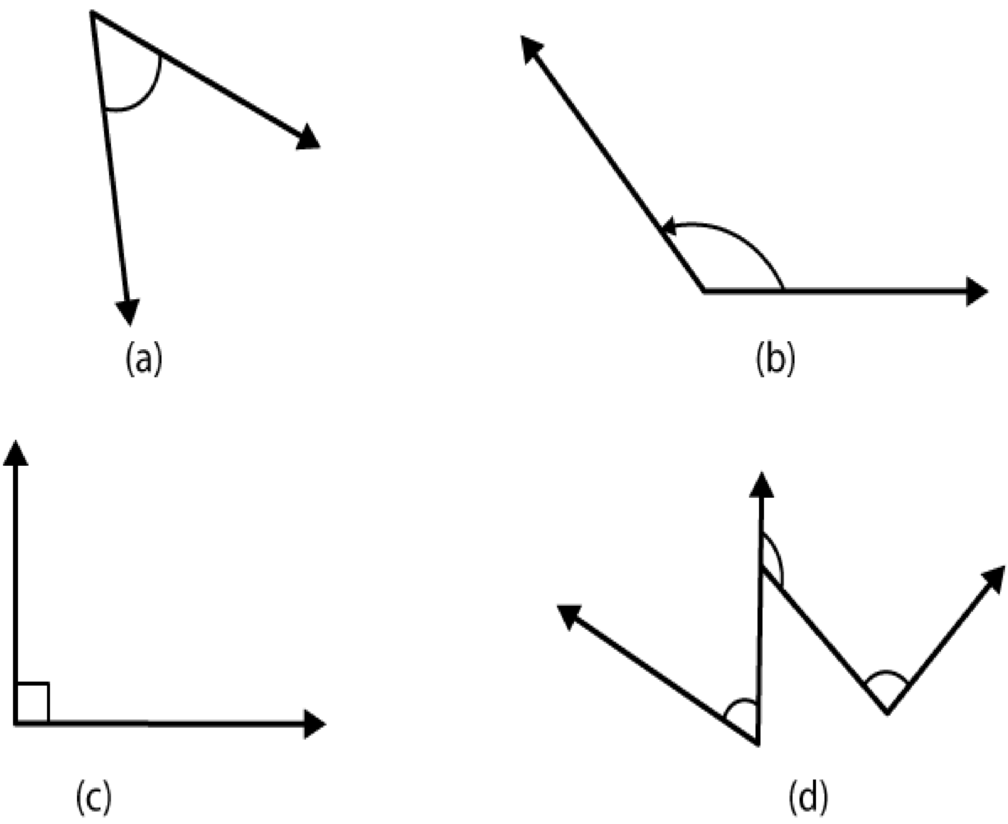
(give at least two examples of each)

Solutions:

(a) The measures of an acute angle are 50^0, 65^0

(b) The measures of obtuse angle are 110^0, 175^0

4. Measures the angles given below using the protractor and write down the measure.



Solutions:

(a) The measure of an angle is 45^0

(b) The measure of an angle is 120^0

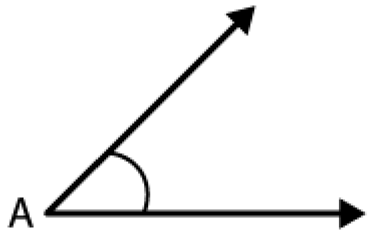
(c) The measure of an angle is 90^0

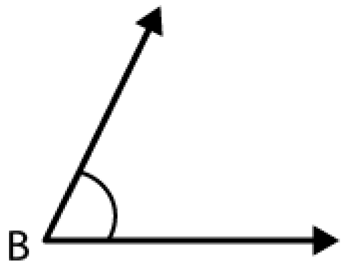
(d) The measures of an angles are 60^0, 90^0 and 130^0

5. Which angle has a large measure? First estimate and then measure.

Measure of Angle A =

Measure of Angle B =





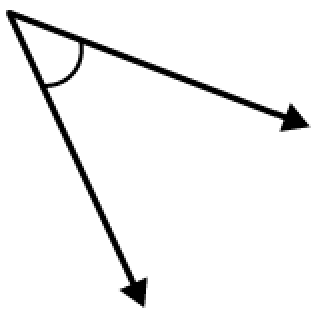
Solutions:

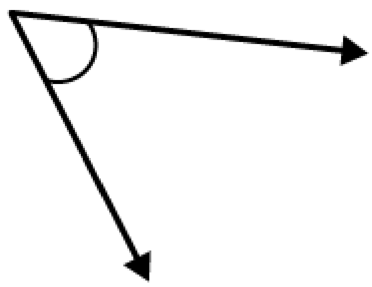
The measure of angle A is 40^0

The measure of angle B is 68^0

∠B has a large measure than ∠A

6. From these two angles which has larger measure? Estimate and then confirm by measuring them.





Solutions:

The measures of these angles are 45^0 and 55^0. Hence, angle shown in second figure is greater.

7. Fill in the blanks with acute, obtuse, right or straight:

(a) An angle whose measure is less than that of a right angle is ______

(b) An angle whose measure is greater than that of a right angle is _____

(c) An angle whose measure is the sum of the measures of two right angles is ________

(d) When the sum of the measures of two angles is that of a right angle, then each one of them is ______

(e) When the sum of the measures of two angles is that of a straight angle and if one of them is acute then the other should be _______

Solutions:

(a) An angle whose measure is less than that of a right angle is acute angle

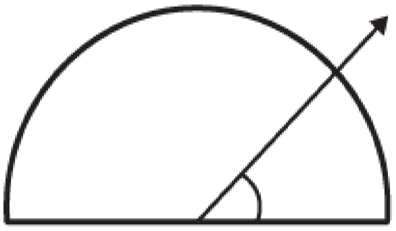
(b) An angle whose measure is greater than that of a right angle is obtuse angle (but less than 180^0)

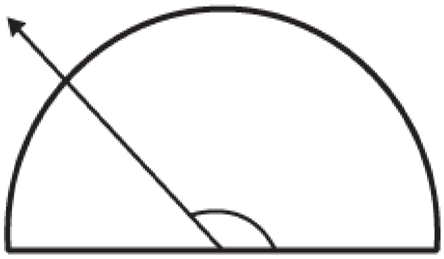
(c) An angle whose measure is the sum of the measures of two right angles is straight angle

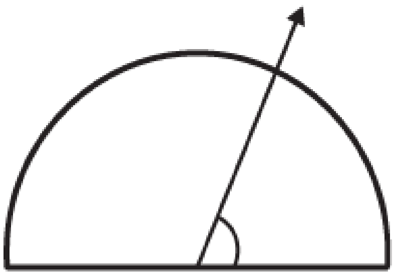
(d) When the sum of the measures of two angles is that of a right angle, then each one of them is acute angle

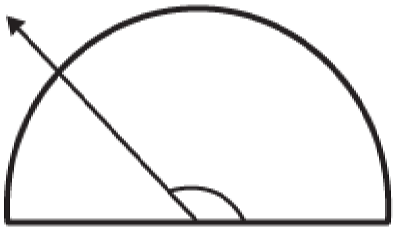
(e) When the sum of the measures of two angles is that of a straight angle and if one of them is acute then the other should be obtuse angle.

8. Find the measure of the angle shown in each figure. (First estimate with your eyes and then find the actual measure with a protractor).









Solutions:

The measures of the angles shown in above figure are 40^0, 130^0, 65^0 and 135^0

9. Find the angle measure between the hands of the clock in each figure:

Solutions:

The angle measure between the hands of the clock are 90^0, 30^0 and 180^0

Exercise 5.5

1. Which of the following are models for perpendicular lines:

(a) The adjacent edges of a table top.

(b) The lines of a railway track.

(c) The line segments forming the letter ‘L’.

(d) The letter V.

Solutions:

(a) The adjacent edges of a table top are perpendicular to each other.

(b) The lines of a railway track are parallel to each other.

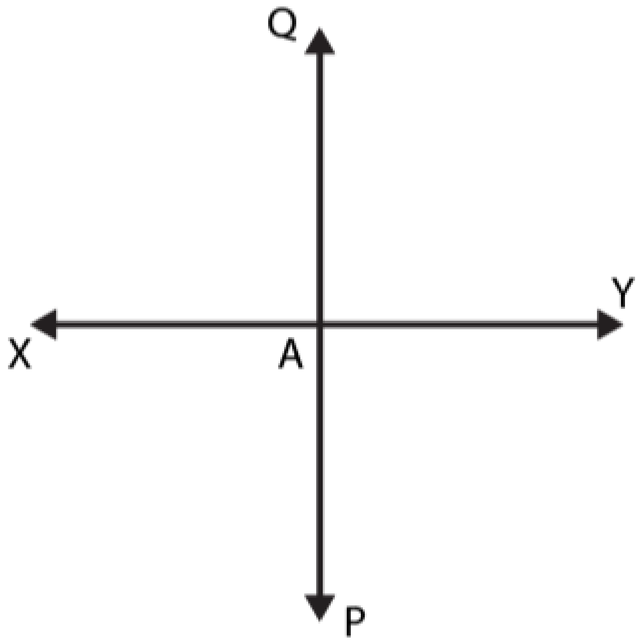
(c) The line segments forming the letter ‘L’ are perpendicular to each other

(d) The sides of letter V are inclined forming an acute angle.

Therefore (a) and (c) are models for perpendicular lines.

2. Let $\overline{PQ}$ be the perpendicular to the line segment $\overline{XY}$.
Let $\overline{PQ}$ and $\overline{XY}$ intersect in the point A. What is the measure of ∠PAY?

Solutions:



From the figure it is clear that the measure of ∠PAY is 90^0

3. There are two set squares in your box. What are the measures of the angles that are formed at their corners? Do they have any angle measure that is common?

Solutions:

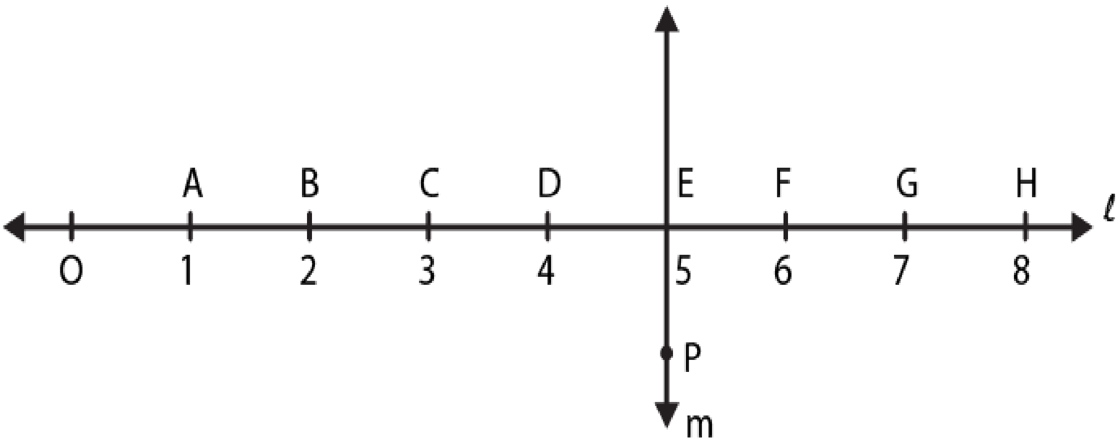
The measure of angles in one set square are 30^0, 60^0 and 90^0

The other set square has a measure of angles 45^0, 45^0 and 90^0

Yes, the angle of measure 90^0 is common in between them

4. Study the diagram. The line l is perpendicular to line m

(a) Is CE = EG?



(b) Does PE bisect CG?

(c) Identify any two line segments for which PE is the perpendicular bisector.

(d) Are these true?

(i) AC > FG

(ii) CD = GH

(iii) BC < EH.

Solutions:

(a) Yes, since, CE = 2 units and EG = 2 units respectively

(b) Yes. Since, CE = EG as both are of 2 units. Hence PE bisect CG

(c) $\overline{BH}$and $\overline{DF}$are the line segments for which PE is the perpendicular bisector

(d) (i) True. Since AC = 2 units and FG = 1 unit

∴ AC > FG

(ii) True because both are of 1 unit

(iii) True. Since, BC = 1 unit and EH = 3 units

∴ BC < EH

Exercise 5.6

1. Name the types of following triangles:

(a) Triangle with lengths of sides 7 cm, 8 cm and 9 cm.

(b) ∆ABC with AB = 8.7 cm, AC = 7 cm and BC = 6 cm.

(c) ∆PQR such that PQ = QR = PR = 5 cm.

(d) ∆DEF with ∠D = 90°

(e) ∆XYZ with ∠Y = 90° and XY = YZ.

(f) ∆LMN with ∠L = 30°, ∠M = 70° and ∠N = 80°.

Solutions:

(a) Scalene triangle

(b) Scalene triangle

(c) Equilateral triangle

(d) Right angled triangle

(e) Right angled isosceles triangl

(f) Acute angled triangle

2. Match the following:

Measures of Triangle Type of Triangle

(i) 3 sides of equal length (a) Scalene

(ii) 2 sides of equal length (b) Isosceles right angled

(iii) All sides are of different length (c) Obtuse angled

(iv) 3 acute angles (d) Right angled

(v) 1 right angle (e) Equilateral

(vi) 1 obtuse angle (f) Acute angled

(vii) 1 right angle with two sides of equal length (g) Isosceles

Solutions:

(i) Equilateral triangle

(ii) Isosceles triangle

(iii) Scalene triangle

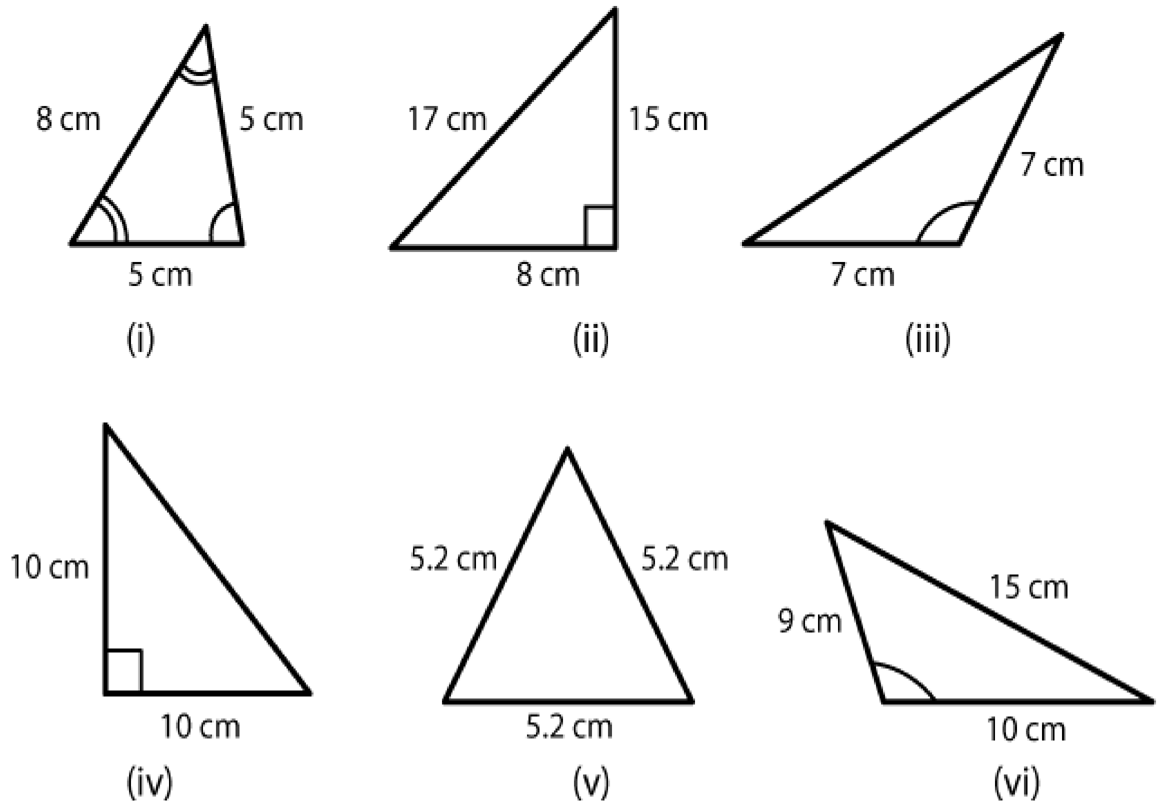
(iv) Acute angled triangle

(v) Right angled triangle

(vi) Obtuse angled triangle

(vii) Isosceles right angled triangle

3. Name each of the following triangles in two different ways: (you may judge the nature of the angle by observation)



Solutions:

(i) Acute angled and isosceles triangle

(ii) Right angled and scalene triangle

(iii) Obtuse angled and isosceles triangle

(iv) Right angled and isosceles triangle

(v) Equilateral and acute angled triangle

(vi) Obtuse angled and scalene triangle

4. Try to construct triangles using match sticks. Some are shown here. Can you make a triangle with

(a) 3 matchsticks?

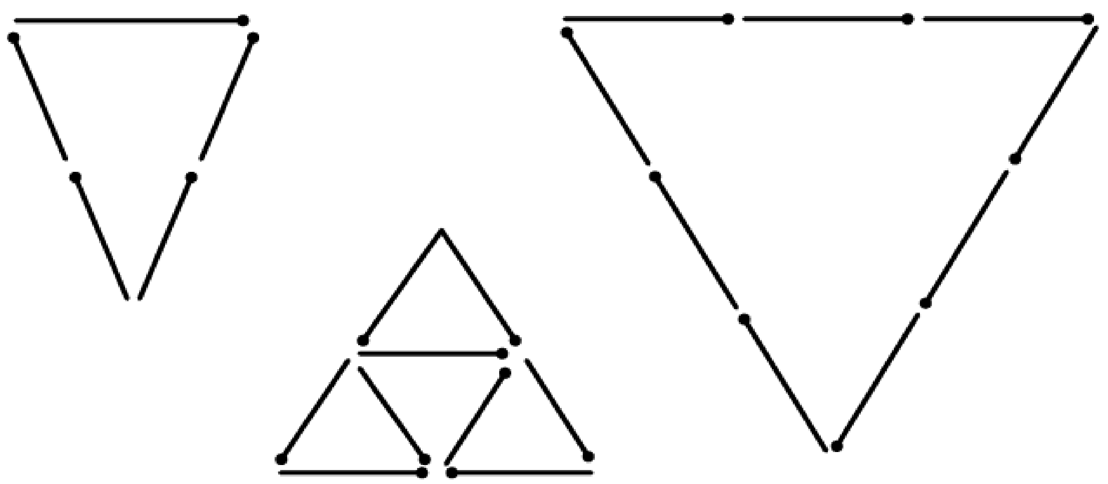
(b) 4 matchsticks?

(c) 5 matchsticks?

(d) 6 matchsticks?

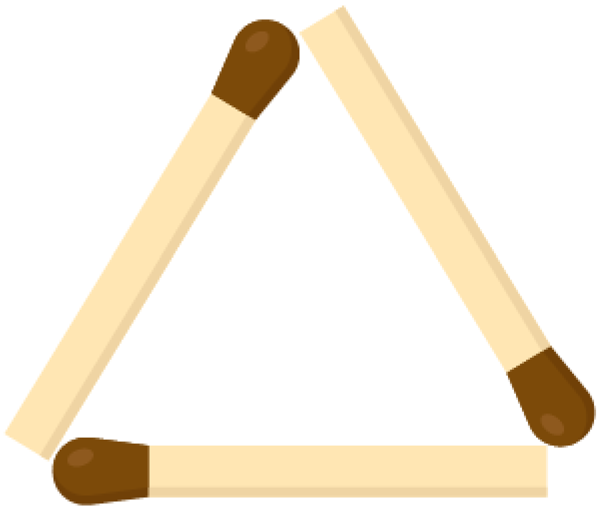
(Remember you have to use all the available matchsticks in each case)

Name the type of triangle in each case. If you cannot make a triangle, think of reasons for it



Solutions:

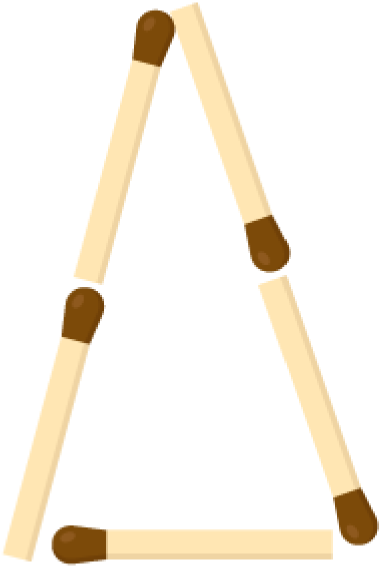
(a) By using three match sticks we may make a triangle as shown below



The above triangle is an equilateral triangle

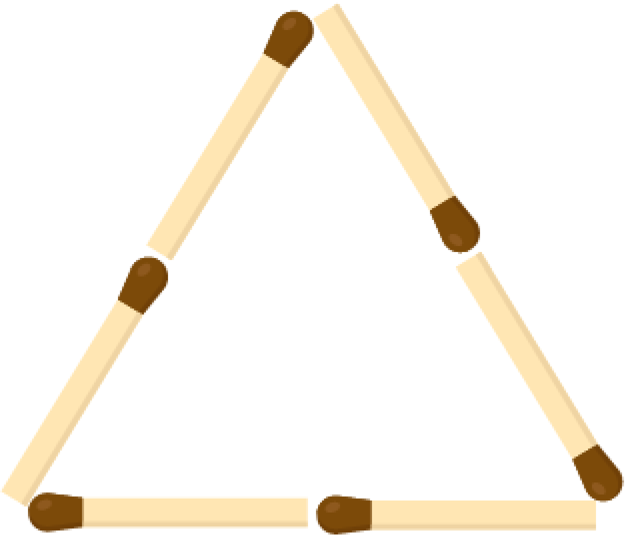
(b) By using 4 match sticks we cannot make a triangle, since we know that sum of the lengths of any two sides of a triangle is always greater than the third side.

(c) By using 5 match sticks we may make a triangle as shown below



The above triangle is an isosceles triangle

(d) By using 6 match sticks we may make a triangle as shown below



The above triangle is an equilateral triangle

Exercise 5.7

1. Say True or False:

(a) Each angle of a rectangle is a right angle.

(b) The opposite sides of a rectangle are equal in length.

(c) The diagonals of a square are perpendicular to one another.

(d) All the sides of a rhombus are of equal length.

(e) All the sides of a parallelogram are of equal length.

(f) The opposite sides of a trapezium are parallel.

Solutions:

(a) True, each angle of a rectangle is a right angle

(b) True, the opposite sides of a rectangle are equal in length.

(c) True, the diagonals of a square are perpendicular to one another

(d) True, all the sides of a rhombus are of equal length

(e) False, all the sides of a parallelogram are not equal

(f) False, the opposite sides of a trapezium are not parallel

2. Give reasons for the following:

(a) A square can be thought of as a special rectangle.

(b) A rectangle can be thought of as a special parallelogram.

(c) A square can be thought of as a special rhombus.

(d) Squares, rectangles, parallelograms are all quadrilaterals.

(e) Square is also a parallelogram.

Solutions:

(a) A rectangle in which all the interior angles are of same measure i.e 90^0 and only opposite sides of the rectangle are of same length whereas in square all the interior angles are of 90^0 and all the sides of the square are of same length. Hence, a rectangle with all sides equal becomes a square. Therefore square is a special rectangle.

(b) In a parallelogram opposite sides are parallel and equal. In a rectangle opposite sides are parallel and equal. The interior angles of the rectangle are of same measure i.e 90^0. Hence, a parallelogram with each angle as right angle becomes a square. Therefore a rectangle is a special parallelogram

(c) All sides of a rhombus and square are equal but in case of square all interior angles are of 90^0. A rhombus with each angle as right angle becomes a square. Therefore a square is a special rhombus

(d) Since, all are closed figures with 4 line segments. Hence all are quadrilaterals

(e) Opposite sides of a parallelogram are equal and parallel whereas in a square opposite sides are parallel and all 4 sides are of same length. Therefore a square is a special parallelogram.

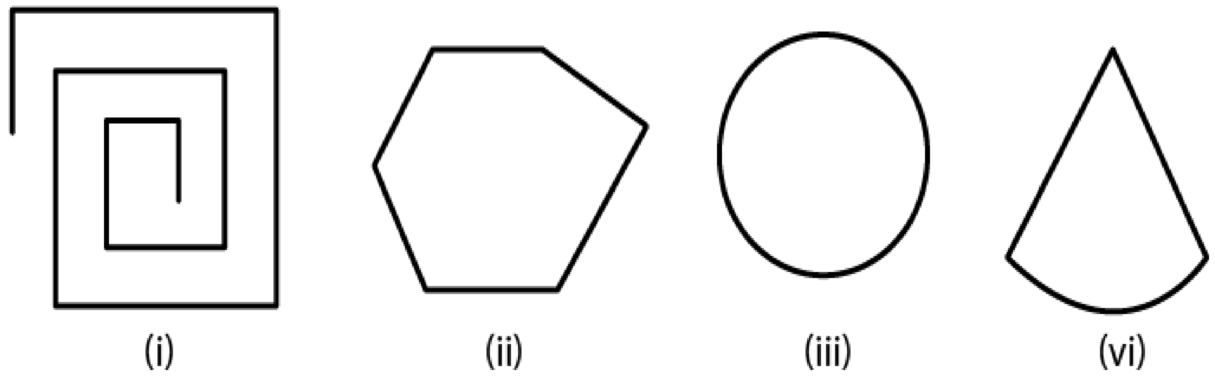
3. A figure is said to be regular if its sides are equal in length and angles are equal in measure. Can you identify the regular quadrilateral?

Solutions:

Square is a regular quadrilateral because all the interior angles are of 90^0 and all sides are of same length.

Exercise 5.8

1. Examine whether the following are polygons. If any one among them is not, say why?



Solutions:

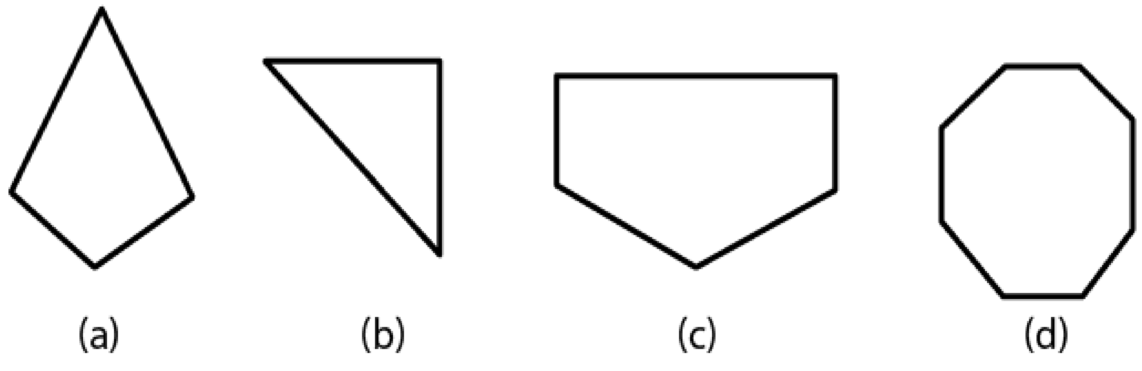
(i) It is not a closed figure. Hence, it is not a polygon.

(ii) It is a polygon made of six sides

(iii) No it is not a polygon because it is not made of line segments.

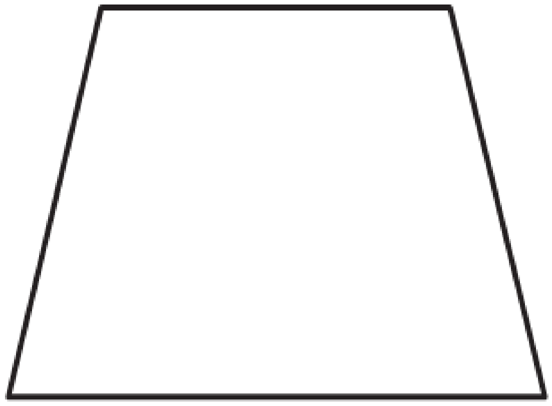
(iv) It is not a polygon as it is not made of line segments.

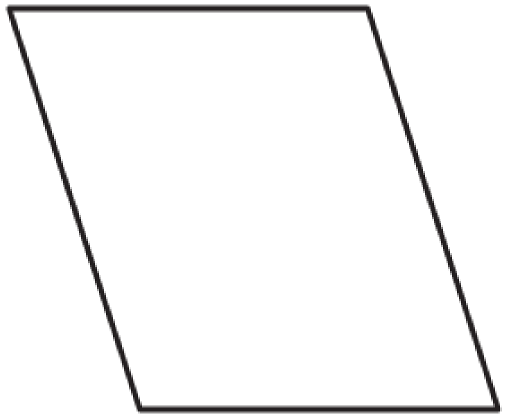
2. Name each polygon.



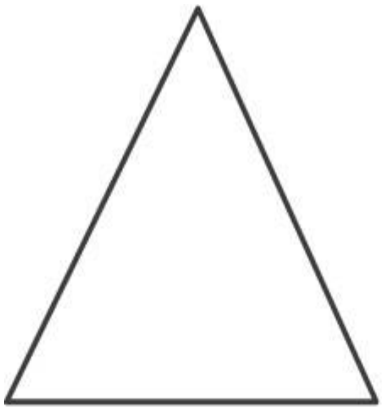
Make two more examples of each of these.

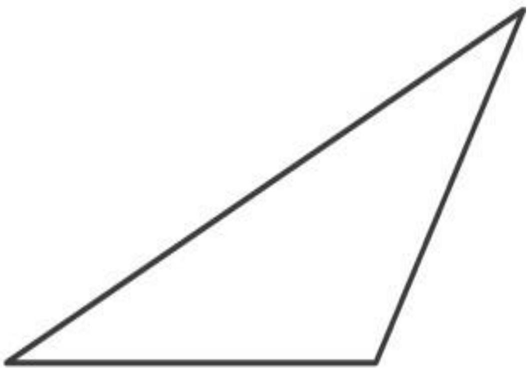
(a) It is a closed figure and is made of four line segments. Hence, the given figure is a quadrilateral. Two more examples are



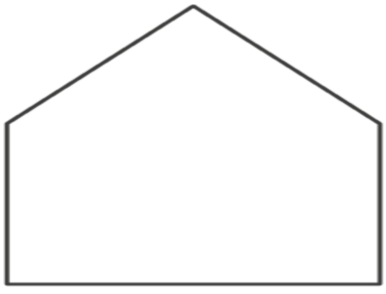


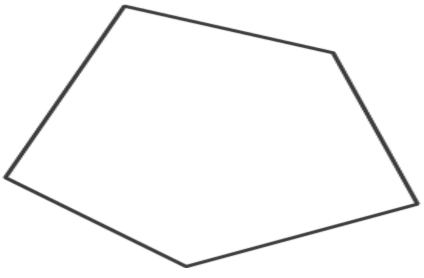
(b) The given figure is a triangle as it is a closed figure with 3 line segments. Two more examples are



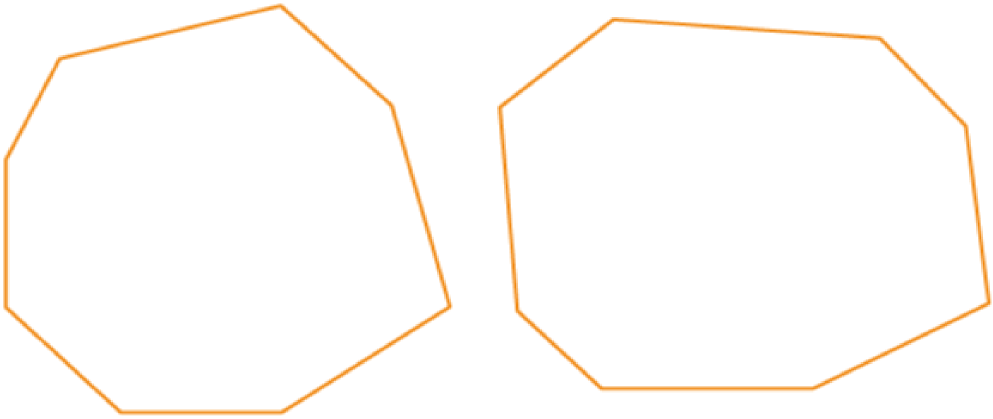


(c) The given figure is a pentagon as this closed figure made of 5 line segments. Two more examples are





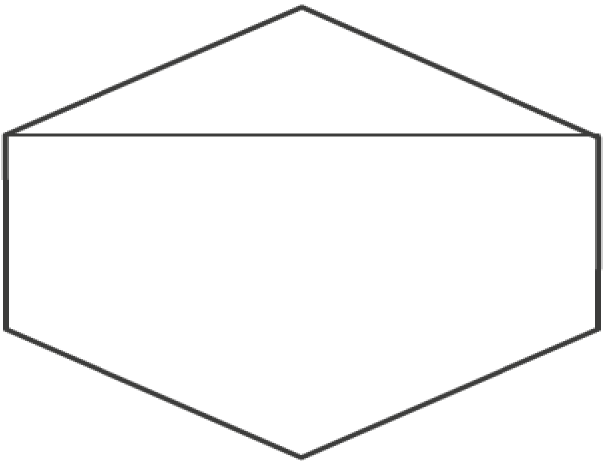
(d) The given figure is an octagon as it is a closed figure made of 8 line segments. Two more examples are



3. Draw a rough sketch of a regular hexagon. Connecting any three of its vertices, draw a triangle. Identify the type of the triangle you have drawn.

Solutions:

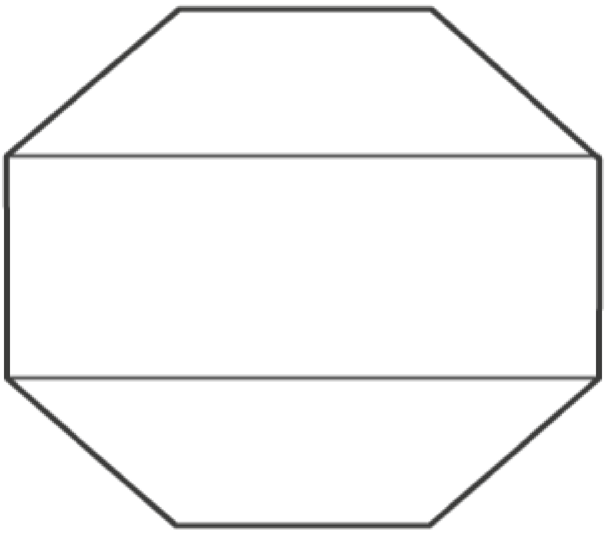
We can draw an isosceles triangle by joining three of vertices of a hexagon as shown in below figure



4. Draw a rough sketch of a regular octagon. (Use squared paper if you wish). Draw a rectangle by joining exactly four of the vertices of the octagon.

Solution:

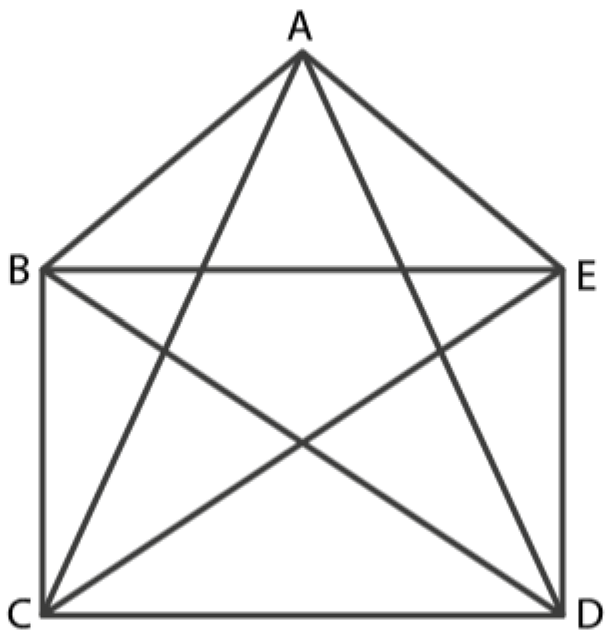
The below figure is a regular octagon in which a rectangle is drawn by joining four of the vertices of the octagon.



5. A diagonal is a line segment that joins any two vertices of the polygon and is not a side of the polygon. Draw a rough sketch of a pentagon and draw its diagonals.

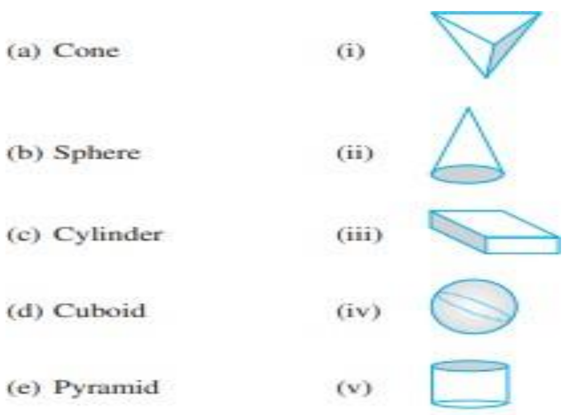
Solutions:

From the figure we may find AC, AD, BD, BE and CE are the diagonals



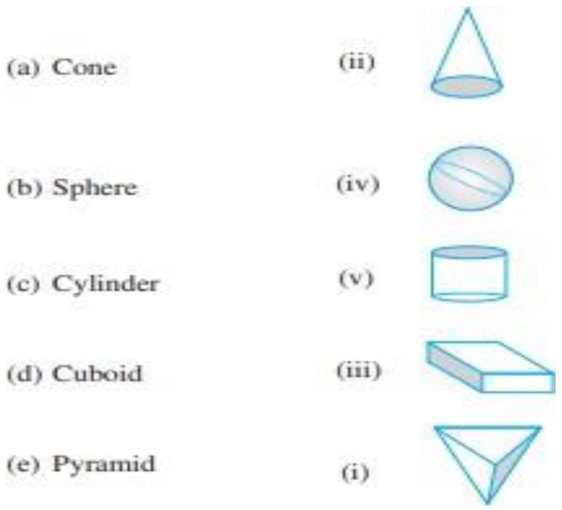
Exercise 5.9

1. Match the following:



Give two new examples of each shape.

Solutions:



(a) An ice cream cone and birthday cap are examples of cone

(b) Cricket ball and tennis ball are examples of sphere

(c) A road roller and lawn roller are examples of cylinder

(d) A book and a brick are examples of cuboid

(e) A diamond and Egypt pyramids are examples of pyramid

2. What shape is

(a) Your instrument box?

(b) A brick?

(c) A match box?

(d) A road-roller?

(e) A sweet laddu?

Solutions:

(a) The shape of an instrument box is cuboid

(b) The shape of a brick is cuboid

(c) The shape of a match box is cuboid

(d) The shape of a road roller is cylinder

(e) The shape of a sweet laddu is sphere