CBSE NCERT Solutions for Class 6 Mathematics Chapter 5

Back of Chapter Questions

Exercise 5.1

1. What is the disadvantage in comparing line segments by mere observation?

Solution:

There may be possibility of error due to improper viewing.

2. Why is it better to use a divider than a ruler, while measuring the length of a line segment?

Solution:

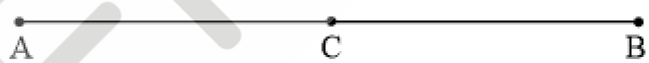
It is better to use a divider than a ruler, because the thickness of the ruler may cause difficulties in reading off its length. However, divider gives up accurate measurement as it taken from end to end.

3. 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 $AB = AC + CB$?

[Note: If A, B, C are any three points on a line such that $AC + CB = AB$, then we can be sure that C lies between A and B.]

Solution:

Yes.



Let, $AB = 6.5$ cm, $AC = 3$cm, $CB = 3.5$ cm

We can observe that, $AC + CB = 3\text{ cm} + 3.5\text{ cm} = 6.5\text{ cm} = AB$

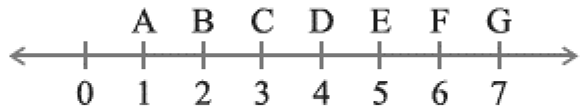
$\therefore\ AB = AC + CB$

4. 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?

Solution:

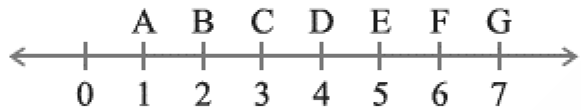
From given data $\overline{AC}$ is the longest line segment, thus B is the point between A and C.

5. Verify, whether D is the mid-point of $\overline{AG}$.



Solution:

Given, AD = 3 units, DG = 3 units



AD = DG

Thus, D is the mid-point.

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

Solution:

B is the mid-point of AC.

$\Rightarrow$ AB = BC …... (i)

And C is the mid-point of $\overline{BD}$.

$\Rightarrow$ BC = CD ... (ii)

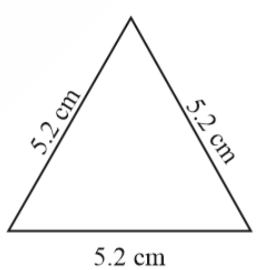
From equation (i) and (ii), we get

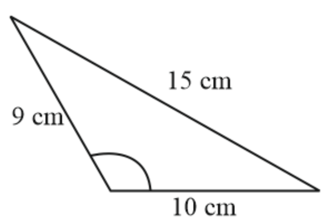
$\therefore$ AB = CD

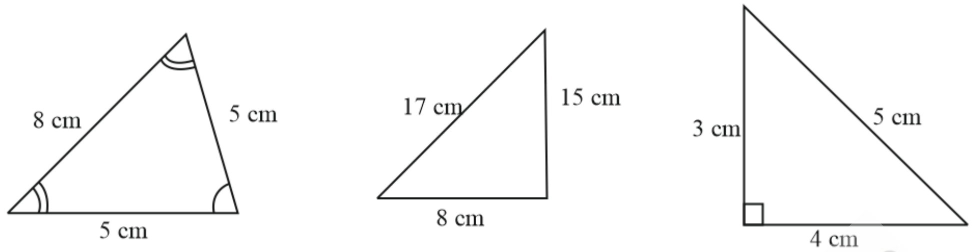
7. Draw five triangles and measure their sides. Check in each case, if the sum of the lengths of any two sides is always greater than the third side.

Solution:

Yes, sum of two sides of a triangle is always greater than the third side.







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

Solution:

(A) From clock we can say that hour hand of a clock turns through $\frac{6}{12} = \frac{1}{2}$ revolution or two right angles

(B) From clock we can say that hour hand of a clock turns through $\frac{3}{12} = \frac{1}{4}$ or one right angle

(C) From clock we can say that hour hand of a clock turns through $\frac{3}{12} = \frac{1}{4}$ or one right angle

(D) From clock we can say that hour hand of a clock turns through $\frac{9}{12} = \frac{3}{4}$ or three right angles.

(E) From clock we can say that hour hand of a clock turns through $\frac{9}{12} = \frac{3}{4}$ or three right angles.

(F) From clock we can say that hour hand of a clock turns through $\frac{9}{12} = \frac{3}{4}$ or three right angles.

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

(A) starts at 12 and makes $\frac{1}{2}$ of a revolution, clockwise?

(B) starts at 2 and makes $\frac{1}{2}$ of a revolution, clockwise?

(C) starts at 5 and makes $\frac{1}{4}$ of a revolution, clockwise?

(D) starts at 5 and makes $\frac{3}{4}$ of a revolution, clockwise?

Solution:

(A) Hand of clock starts at 12 and makes $\frac{1}{2}$ of a revolution, clockwise that means it travelled for 6 hours so, it will stop at 6

(B) Hand of clock starts at 2 and makes $\frac{1}{2}$ of a revolution, clockwise that means it travelled for 6 hours so, it will stop at 8

(C) Hand of clock starts at 5 and makes $\frac{1}{4}$ of a revolution, clockwise that means it travelled for 3 hours so, it will stop at 8

(D) Hand of clock starts at 5 and makes $\frac{3}{4}$ of a revolution, clockwise that means it travelled for 9 hours so, it will stop at 2

3. Which direction will you face if you start facing

(A) east and make $\frac{1}{2}$ of a revolution clockwise?

(B) east and make $1\frac{1}{2}$ of a revolution clockwise?

(C) west and make $\frac{3}{4}$ 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?)

Solution:

(A) Facing east and make $\frac{1}{2}$ of a revolution clockwise that means making 180^o results west.

(B) Facing east and make $1\frac{1}{2}$ of a revolution clockwise that means making 540^o results west.

(C) Facing west and make $\frac{3}{4}$ of a revolution anti-clockwise that means making 270^o results north.

(D) Facing east and make 1 of a revolution that means making 360^o results south.

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?

Solution:

(A) Facing east and turn clockwise to face north, that means 270^{o} are covered so $\frac{3}{4}$ of a revolution have turned

(B) Facing south and turn clockwise to face east, that means 270^{o} are covered so $\frac{3}{4}$ of a revolution have turned

(C) Facing west and turn clockwise to face east, that means 180^{o} are covered so $\frac{1}{2}$ of a revolution have turned

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

Solution:

(A) Hour hand of a clock goes from 3 to 6 that means it is covering 3 hours that implies $\frac{1}{4}$ of revolution so, one right angle.

(B) Hour hand of a clock goes from 2 to 8 that means it is covering 6 hours that implies $\frac{1}{2}$ of revolution so, two right angles.

(C) Hour hand of a clock goes from 5 to 11 that means it is covering 6 hours that implies $\frac{1}{2}$ of revolution so, two right angles.

(D) Hour hand of a clock goes from 10 to 1 that means it is covering 3 hours that implies $\frac{1}{4}$ of revolution so, one right angle.

(E) Hour hand of a clock goes from 12 to 9 that means it is covering 9 hours that implies $\frac{3}{4}$ of revolution so, three right angles.

(F) Hour hand of a clock goes from 12 to 6 that means it is covering 6 hours that implies $\frac{1}{2}$ of revolution so, two 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?

Solution:

(A) Facing south and turn clockwise to face west, that implies $\frac{1}{4}$ of a revolution so, one right angle

(B) Facing north and turn clockwise to face east, that implies $\frac{3}{4}$ of a revolution so, three right angles

(C) Facing west and turn clockwise to face west, that implies a complete revolution so, four right angles

(D) Facing south and turn clockwise to face north, that implies $\frac{1}{2}$ of a revolution so, two 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?

Solution:

(A) Hour hand of a clock starts from 6 and turns through 1 right angle that implies it is making $\frac{1}{4}$ of revolution so, it will be at 9

(B) Hour hand of a clock starts from 8 and turns through 2 right angle that implies it is making $\frac{1}{2}$ of revolution so, it will be at 2

(C) Hour hand of a clock starts from 10 and turns through 3 right angle that implies it is making $\frac{3}{4}$ of revolution so, it will be at 7

(D) Hour hand of a clock starts from 7 and turns through 1 straight angle that implies it is making $\frac{1}{2}$ of revolution so, it will be 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 $\frac{1}{4}$ and $\frac{1}{2}$ of a revolution
	(F) One complete revolution

Solution:

(i) Straight angle is 180^{o} that implies half of revolution → (C)

(ii) Right angle is 90^{o} that implies $\frac{1}{4}$ of revolution→ (D)

(iii) Acute angle is an angle between 0^{o} to 90^{o} that implies less than one-fourth of a revolution → (A)

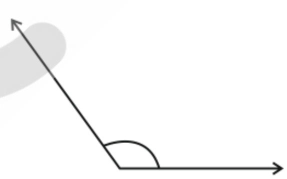
(iv) Obtuse angle is an angle between 90^{o} to 180^{o} that implies between $\frac{1}{4}$ and $\frac{1}{2}$ of a revolution (E)

(v) Reflex angle is an angle greater than 180^{o} that implies more than half a revolution → (B)

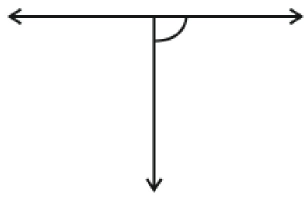
2. Classify each one of the following angles as right, straight, acute, obtuse or reflex:

(A)

(B)



(C)



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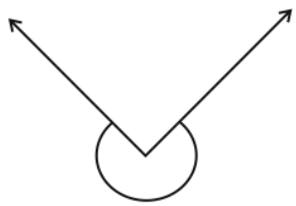

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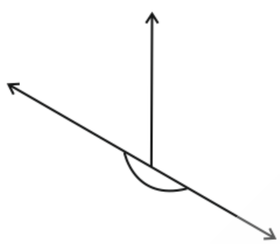


(F)

Solution:

(A) As the given angle is between 0^o to 90^o so it is acute angle

(B) As the given angle is between 90^o to 180^o so it is obtuse angle

(C) As the given angle is 90^o so it is right angle

(D) As the given angle is greater than 180^o so it is reflex angle

(E) As the given angle is 180^o so it is straight angle

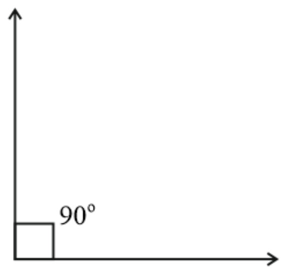
(F) As the given angle is between 0^o to 90^o so it is acute angle

Exercise 5.4

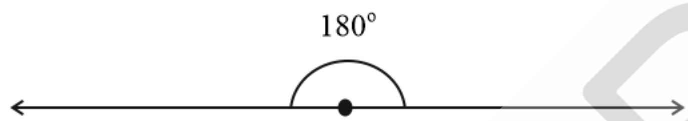
1. What is the measure of (i) a right angle? (ii) a straight angle?

Solution:

(i) 90^o



(ii) 180^o



2. Say True or False:

(A) The measure of an acute angle $< 90^o$.

(B) The measure of an obtuse angle $< 90^o$.

(C) The measure of a reflex angle $> 180^o$.

(D) The measure of one complete revolution $= 360^o$.

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

Solution:

(A) As the given angle is between 0^o to 90^o so it is acute angle. True

(B) Obtuse angle is an angle between 90^o to 180^o. False

(C) Reflex angle is an angle greater than 180^o. True

(D) The measure of one complete revolution is 360^o. True

(E) We know that $53^o > 35^o$ so $m\angle A > m\angle B$. True

3. Write down the measures of

(A) some acute angles.

(B) some obtuse angles

(give at least two examples of each)

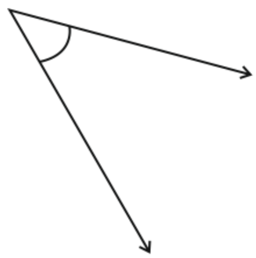
Solution:

(A) Acute angle is an angle between 0^o to 90^o so some examples are $35^o, 20^o$

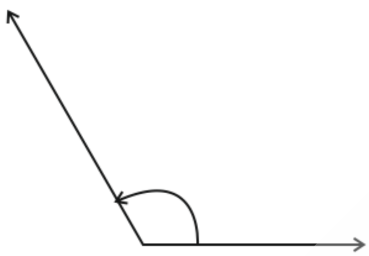
(B) Obtuse angle is an angle between 90^o to 180^o so some examples are $110^o, 135^o$

4. Measure the angles given below using the Protractor and write down the measure.

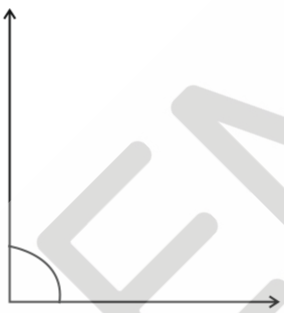
(A)



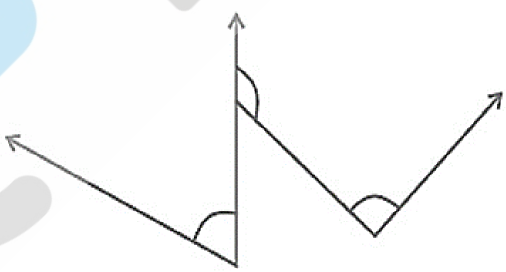
(B)



(C)



(D)



Solution:

(A) By using protractor angle is 40°

(B) By using protractor angle is 130°

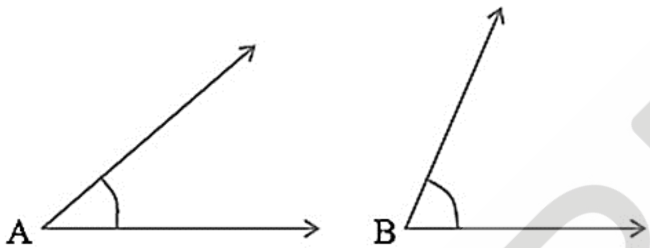
(C) By using protractor angle is 90°

(D) By using protractor angle is 60^{o}

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

Measure of Angle A =

Measure of Angle B =



Solution:

$\angle B$ has larger measure.

$\angle A = 40^{o}$ and $\angle B = 65^{o}$

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

Solution:

Second angle has larger measure

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 ________.

Solution:

(A) acute angle

Acute angle is an angle between 0^o to 90^o

(B) obtuse angle

Obtuse angle is an angle between 90^o to 180^o

(C) straight angle

Straight angle is 180^o

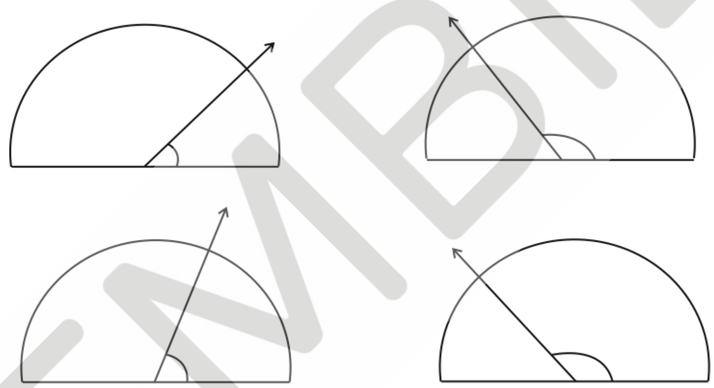
(D) acute angle

Acute angle is an angle between 0^o to 90^o

(E) obtuse angle

Obtuse angle is an angle between 90^o to 180^o

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).



Solution:

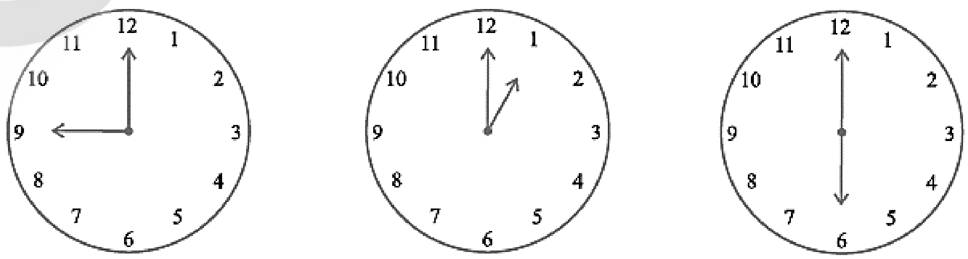
(i) y using protractor angle is 30^o

(ii) By using protractor angle is 120^o

(iii) By using protractor angle is 60^o

(iv) By using protractor angle is 150^o

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



9.00 a.m. 1.00 p.m. 6.00 p.m.

Solution:

(i) From 9 to 12 it is 3 hours that is $\frac{1}{4}$ of a revolution that implies 90^o (Right angle)

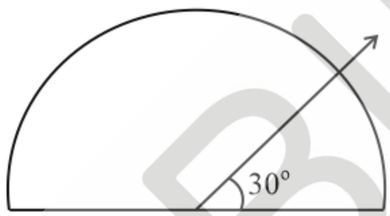
(ii) From 12 to 1 it is 1 hour that implies 30^o (Acute angle)

(iii) From 12 to 6 it is 6 hours that is half a revolution that implies 180^o (Straight angle)

10. Investigate.

In the given figure, the angle measures 30^o. Look at the same figure through a magnifying glass.

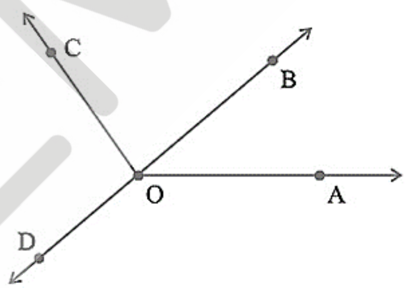
Does the angle become larger? Does the size of the angle change?



Solution:

No, the measure of angle will be same.

11. Measure and classify each angle:



Angle	Measure	Type
∠AOB		
∠AOC		
∠BOC		
∠DOC		
∠DOA		
∠DOB		

Solution:

By using protractor angles are

Angle	$\angle AOB$	$\angle AOC$	$\angle BOC$	$\angle DOC$	$\angle DOA$	$\angle DOB$
Measure	40^o	130^o	90^o	90^o	140^o	180^o
Type	Acute	obtuse	Right	Right	Obtuse	Straight

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.

Solution:

(A) The adjacent edges of a tabletop are at 90^o so they are perpendicular

(B) The lines of a railway track are parallel to each other, so they are not perpendicular

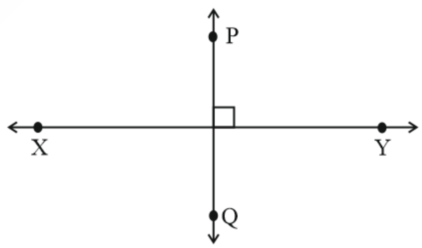
(C) The line segments forming the letter 'L' there is 90^o so they are perpendicular

(D) In letter V there is acute angle, so it is not perpendicular

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 $\angle PAY$?

Solution:

$\angle PAY = 90^o$

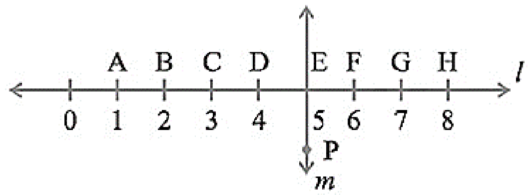


3. There are two "set-squares" in your box. What are the measures of the angles that are formed at their corners? Do they have any angle measure that is common?

Solution:

One set-square has $45^o, 90^o, 45^o$ and other set-square has $60^o, 90^o, 30^o$, They have 90^o, as common angle.

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) $BC < EH$

Solution:

(A) Yes, both measure 2 units

(B) Yes, because $CE = EG$

(C) $\overline{DF}$ and $\overline{CG}, \overline{BH}$

(D) (i) True, (ii) True, (iii) True

Exercise 5.6

1. Name the types of following triangles:

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

(B) ΔABC with $AB = 8.7$ cm, $AC = 7$ cm and $BC = 6$ cm

(C) ΔPQR such that $PQ = QR = PR = 5$ cm

(D) ΔDEF with $m\angle D = 90^o$

(E) ΔXYZ with $m\angle Y = 90^o$ and $XY = YZ$

(F) ΔLMN with $m\angle L = 30^o, m\angle M = 70^o$ and $m\angle N = 80^o$

Solution:

(A) Scalene triangle as lengths are different

(B) Scalene triangle as lengths are different

(C) Equilateral triangle as all the side lengths are equal

(D) Right-angled triangle as one angle is 90^o

(E) Isosceles right-angled triangle as two sides are equal and one angle is 90^o

(F) Acute-angled triangle as all the angles are less than 90^o

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

Solution:

(i) As 3 sides of equal length the triangle is equilateral → (E)

(ii) As 2 sides of equal length the triangle is isosceles → (G)

(iii) As all sides are of different length the triangle is scalene → (A)

(iv) As all the angles are 3 acute angles the triangle is acute angled triangle → (F)

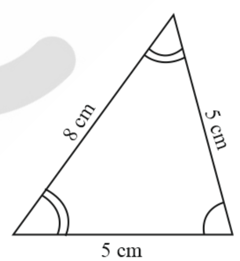
(v) As one angle is right angle the triangle is right angled triangle→ (D)

(vi) As one angle is obtuse angle the triangle is obtuse angled triangle → (C)

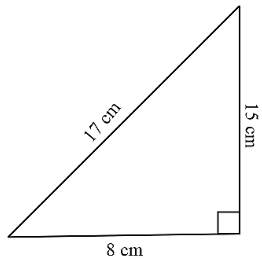
(vii) As 1 right angle with two sides of equal length the triangle is isosceles right-angled triangle → (B)

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

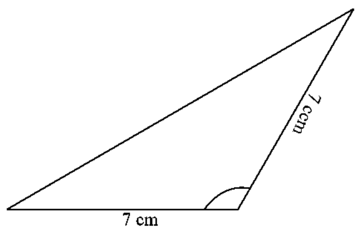
(A)



(B)



(C)



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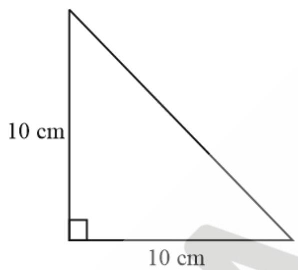
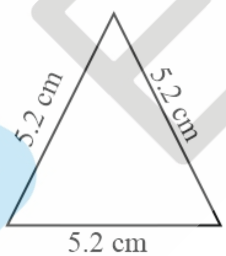
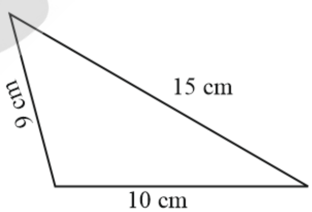


(E)



(F)



Solution:

(A) As two sides are of equal length and all are acute angles, so triangle is acute angled triangle and isosceles triangle

(B) As one angle is 90^{o} and all the sides are of different length, so the triangle is right-angled triangle and scalene triangle

(C) As one angle is greater than 90^{o} and two sides are of same length, so the triangle is obtuse-angled triangle and Isosceles triangle

(D) As one angle is 90^{o} and two sides are of equal length, so the triangle is right-angled triangle and isosceles triangle

(E) As all the sides are of equal angle and equal sides the triangle is equilateral triangle and acute angled triangle

(F) As one angle is greater than 90^{o} and all the sides are of different length the triangle is obtuse-angled triangle 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?

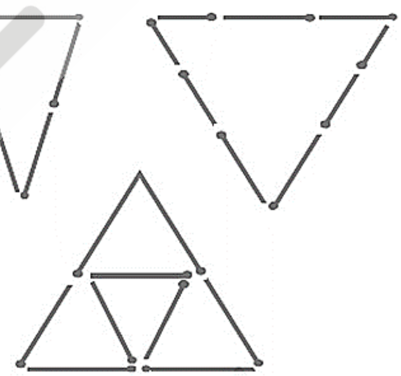
(C) 5 matchsticks?

(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.



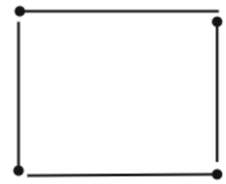
Solution:

(A) 3 matchsticks

This is an acute angle triangle and it is possible with 3 matchsticks to make a triangle because sum of two sides is greater than third side.

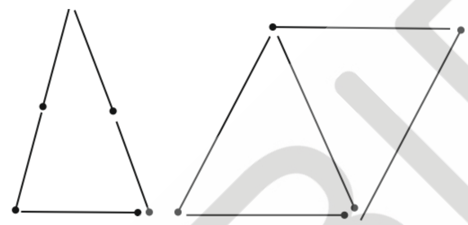
(B) 4 matchsticks

This is a square, hence with four matchsticks we cannot make triangle.



(C) matchsticks

This is an acute angle triangle and it is possible to make triangle with five matchsticks, in this case sum of two sides is greater than third side.



(D) 6 matchsticks

This is an acute angle triangle and it is possible to make a triangle with the help of 6 matchsticks because sum of two sides is greater than third side.

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.

Solution:

(A) We know that all angles in a rectangle is 90^o. So, true.

(B) We know that opposite sides of a rectangle are equal. So, true

(C) We know that in a square, diagonals bisect each other. So, true

(D) We know that a quadrilateral with all the four sides equal and angle angles are not 90^o. So, true

(E) Parallelogram has opposite sides equal. So, false

(G) Trapezium has a pair of parallel sides. So, false

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.

Solution:

(A) Because it's all angles are right angle and opposite sides are equal.

(B) Because its opposite sides are equal and parallel.

(C) Because its four sides are equal, and diagonals are perpendicular to each other.

(D) Because all of them have four sides.

(E) Because its opposite sides are equal and parallel.

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?

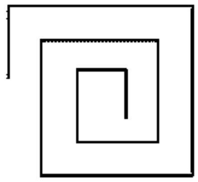
Solution:

A Square is a regular quadrilateral.

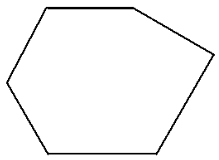
Exercise 5.8

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

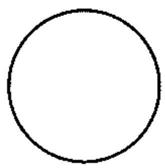
(A)



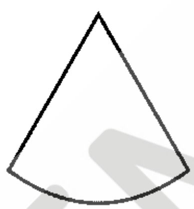
(B)



(C)



(D)



Solution:

(A) As it is not a closed figure, therefore, it is not a polygon.

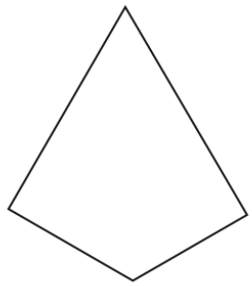
(B) It is a polygon because it is closed by line segments.

(C) It is not a polygon because it is not made by line segments.

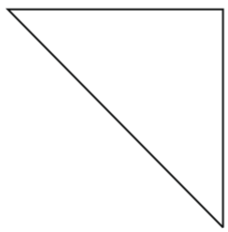
(D) It is not a polygon because it not made only by line segments, it has curved surface also.

2. Name each polygon.

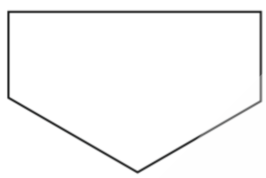
(A)



(B)



(C)



(D)

Make two more examples of each of these.

Solution:

(A) Quadrilateral as given figure has four sides

(B) Triangle as given figure has three sides

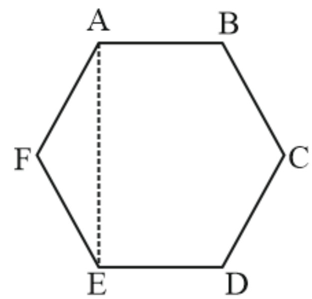
(C) Pentagon as given figure has five sides

(D) Octagon as given figure has eight sides

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.

Solution:

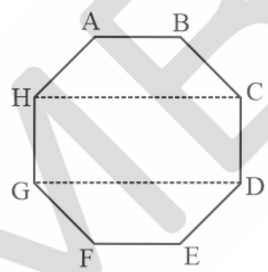
ABCDEF is a regular hexagon and triangle formed by joining AEF is an isosceles triangle because $AF = FE$.



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:

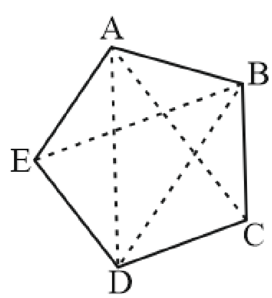
ABCDEFGH is a regular octagon and CDGH is a rectangle because $CD = GH$ and $HC = GD$.



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.

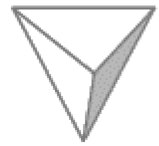
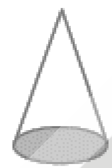
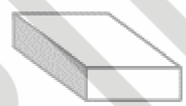
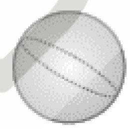
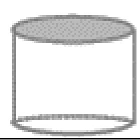
Solution:

ABCDE is the required pentagon and its diagonals are AD, AC, BE and BD.

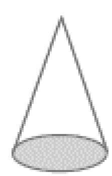
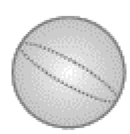


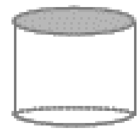
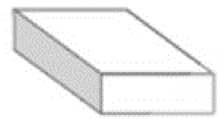
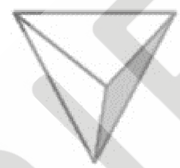
Exercise 5.9

1. Match the following:

(A) Cone	(i) 
(B) Sphere	(ii) 
(C) Cylinder	(iii) 
(D) Cuboid	(iv) 
(E) Pyramid	(v) 

Solution:

(A) Cone	(ii) 
(B) Sphere	(iv) 
(C) Cylinder	(v)

	
(D) Cuboid	(iii) 
(E) Pyramid	(i) 

2. What shape is

(A) Your instrument box?

(B) A brick?

(C) A match box?

(D) A road-roller?

(E) A sweet laddu?

Solution:

(A) Cuboid

(B) Cuboid

(C) Cuboid

(D) Cylinder

(E) Sphere

♦♦♦