CLASS 6TH

MATHS

CHAPTER- 5th

Understanding Elementary Shapes

EXERCISE- 5.1

NCERT SOLUTION

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

Ans.

Chances of errors due to improper viewing are more. You cannot always be sure about your usual judgment.

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

Ans.

Yes, because accurate measurement will be possible. The thickness of the ruler may cause difficulties in reading off the marks on it.

3. Draw any line segment, say 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.]

Ans.

Yes. (Because C is 'between' A and B)

AB is a line segment of 10cm in which AC = 6cm and BC = 4cm.
AC + BC = 6 + 4 = 10cm.
But AB = 10cm
So, 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?

Ans.

Given, AB = 5 cm, BC = 3 cm and AC = 8 cm

AB + BC =AC

5 + 3 = 8

Hence, B lies in between A and C

5. Verify, whether D is the midpoint of $\overline{AG}$.

Ans.

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

6. If B is the midpoint of AC and C is the midpoint of BD, where A, B, C, D lie on a straight line, say why AB = CD?

Ans.

Given, B is the midpoint of AC

AB= BC and

C is the midpoint of BD

BC = CD,

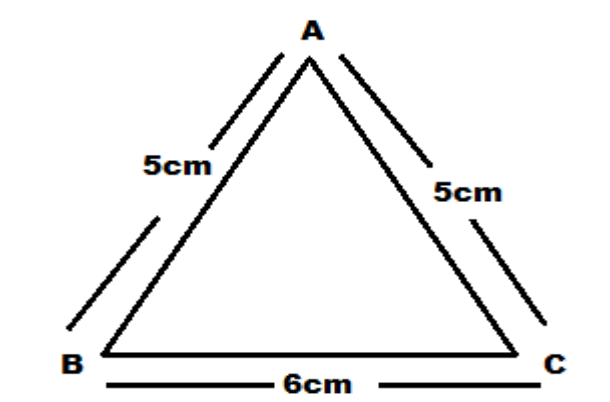
A, B, C, D lie on a straight line

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 less than the third side.

Ans.

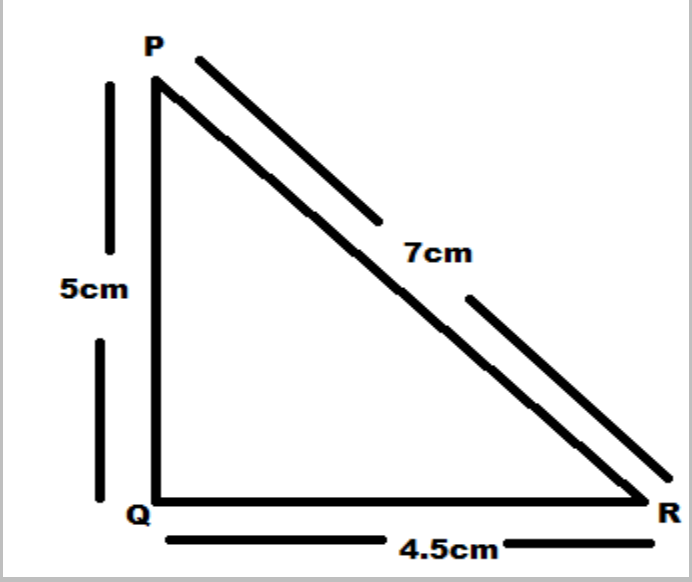
Case 1st



AB + AC > BC
5cm + 5cm > 6cm
10 cm > 6 cm
AB + BC > AC
5cm + 6 cm > 5 cm
11cm > 5cm
AC + BC > AB
5 cm + 6 cm > 5 cm
11 cm > 5cm

Hence, Sum of the length of the two side of triangle is always greater than the third side.

Case 2nd

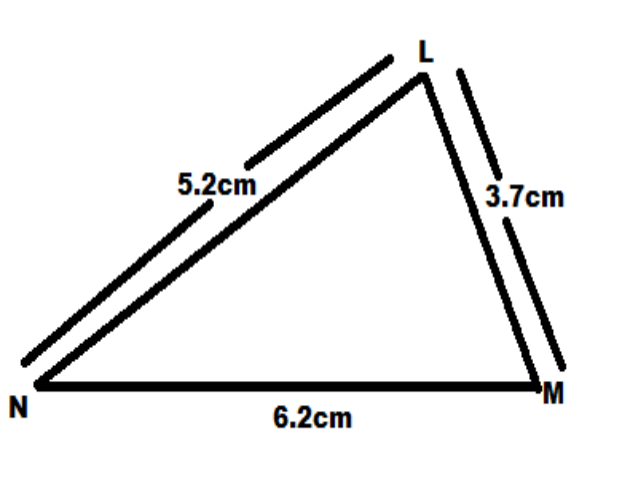


PR + PQ > QR
7 cm + 5 cm > 4.5 cm
12cm > 4.5cm

PQ + QR > PR
5 cm + 4.5 cm > 7 cm
9.5 cm > 5cm
PR + QR > PQ
7cm + 4.5 cm > 5cm
11.5 cm > 5cm

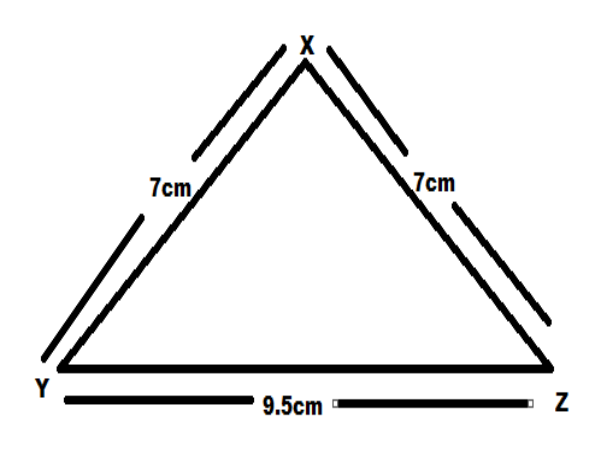
Hence, Sum of the length of the two side of triangle is always greater than the third side.

Case 3rd



LM + LN > NM
3.7cm + 5.2 cm > 6.2 cm
7.9 cm > 6.2 cm
LN + NM > LM
5.2 cm + 6.2 cm > 3.7 cm
11.4 cm > 5 cm
LM + NM > LN
3.7cm + 6.2 cm > 5 cm
9.9 cm > 5 cm
Hence, Sum of the length of the two side of triangle is always greater than the third side.

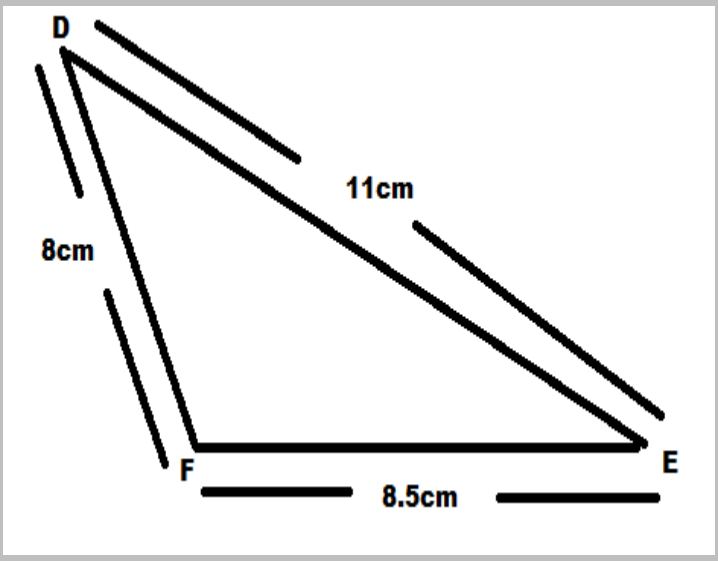
Case 4th



XY + XZ > YZ
7cm + 7cm > 9.5 cm
14 cm > 9.5 cm
XY + YZ > 7cm
7 cm + 9.5 cm > 7 cm
16.5 cm > 7 cm
XZ + YZ > XY
7cm + 9.5 cm > 7 cm
16.5 cm > 7 cm

Hence, Sum of the length of the two side of triangle is always greater than the third side.

Case 5th



DE + FE > DF
11cm + 8.5cm > 8 cm
19.5 cm > 9.5 cm

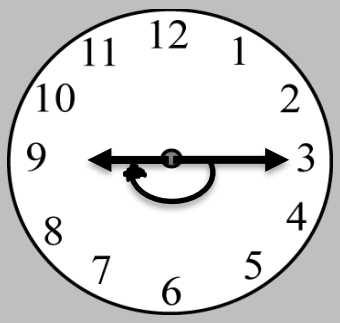
DE + DF > FE
11 cm + 8 cm > 8.5 cm
19 cm > 8.5 cm
DF + FE > DE
8cm + 8.5 cm > 11 cm
16.5 cm > 11 cm
Hence, Sum of the length of the two side of triangle is always greater than the third side.

EXERCISE- 5.2

NCERT SOLUTION

1. What fraction of a clockwise revolution does the hour hand of a clock turn through, when it goes from
(a) 3 to 9

Ans.



$\frac{1}{2}$ of a revolution

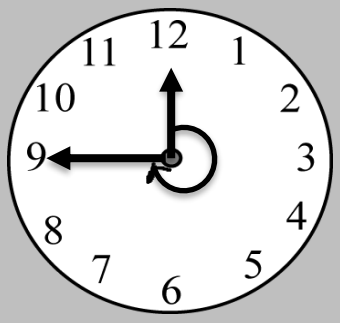
(b) 4 to 7
Ans.

$\frac{1}{4}$ of a revolution

(c) 7 to 10
Ans.

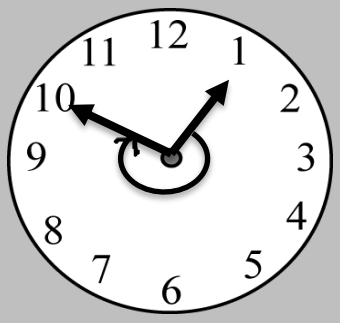
$\frac{1}{4}$ of a revolution

(d) 12 to 9
Ans.



$\frac{3}{4}$ of a revolution

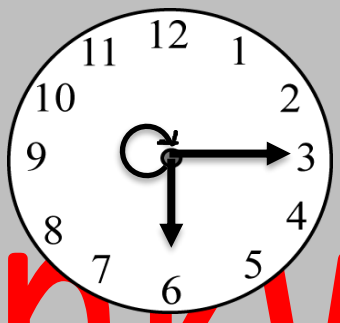
(e) 1 to 10
Ans.



$\frac{3}{4}$ of a revolution

(f) 6 to 3

Ans.

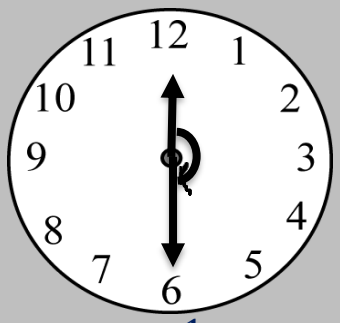


$\frac{3}{4}$ of a revolution

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

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

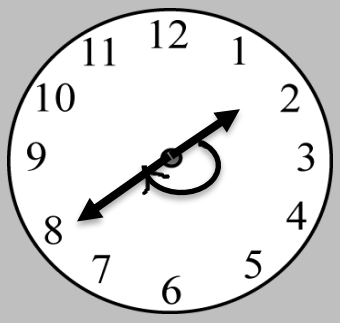
Ans.



If the hour hand starts at 12 and make $\frac{1}{2}$ of a revolution, clockwise the hand of clock stops at 6

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

Ans.



If the hour hand starts at 2 and make $\frac{1}{2}$ of a revolution, clockwise the hand of clock stops at 8.

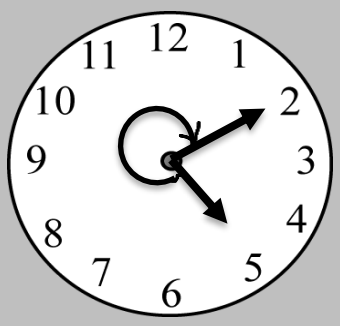
(c) Starts at 5 and makes $\frac{1}{4}$ of a revolution, clockwise?

Ans.

If the hour hand starts at 5 and make $\frac{1}{4}$ of a revolution, clockwise the hand of clock stops at 8.

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

Ans.

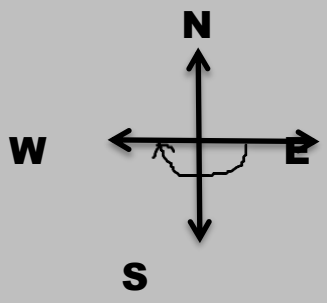


If the hour hand starts at 5 and make $\frac{3}{4}$ of a revolution, clockwise the hand of clock stops at 2.

3. Which direction will you face if you start facing?

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

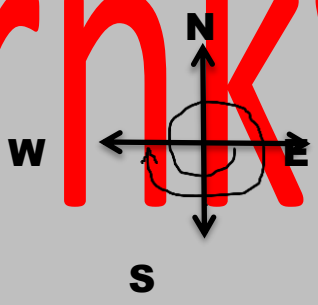
Ans.



If we start facing east and make $\frac{1}{2}$ of a revolution clockwise then we will face toward the west direction.

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

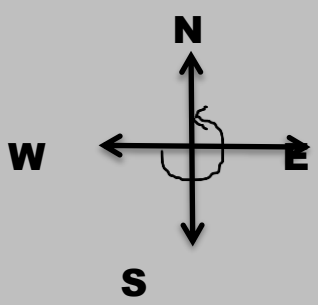
Ans.



If we start facing east and make $1\frac{1}{2}$ of a revolution clockwise then we will face toward the west direction.

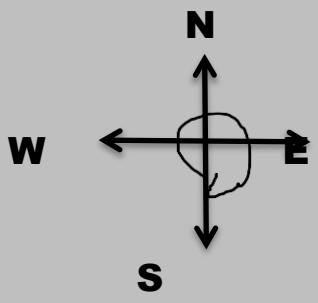
(c) West and make $\frac{3}{4}$ of a revolution anti-clockwise?

Ans.



If we start facing west and make $\frac{3}{4}$ of a revolution anti -clockwise then we will face toward the North direction.

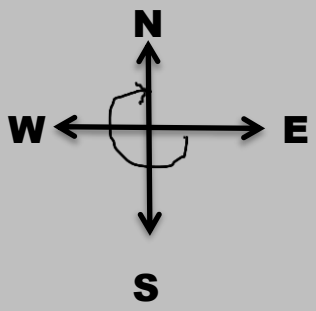
(d) South and make one full revolution?
Ans.



If we start facing south and make one full revolution clockwise then we will face toward the South direction.

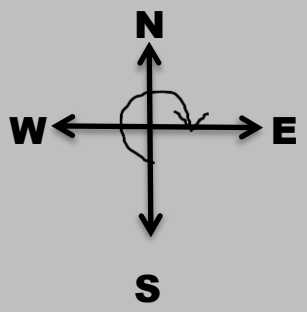
4. What part of a revolution have you turned through if you stand facing?

(a) East and turn clockwise to face north?
Ans.



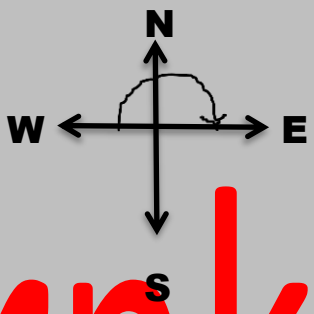
$\frac{3}{4}$ Revolution

(b) South and turn clockwise to face east?
Ans.



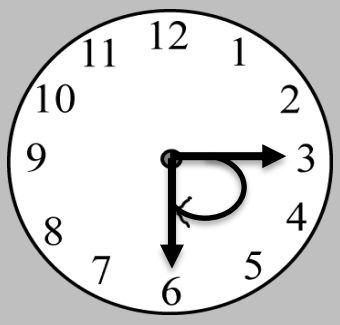
$\frac{3}{4}$ Revolution

(c) West and turn clockwise to face east?
Ans.



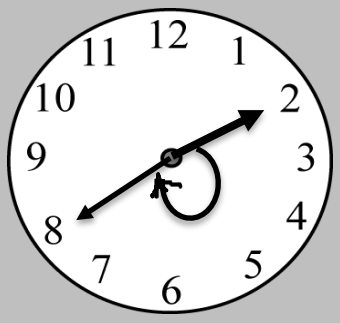
$\frac{1}{2}$ Revolution

5. Find the number of right angles turned through by the hour hand of a clock when it goes from
(a) 3 to 6
Ans.



One Right Angle

(b) 2 to 8
Ans.

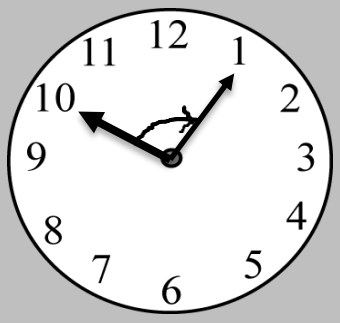


Two Right angle

(c) 5 to 11
Ans.

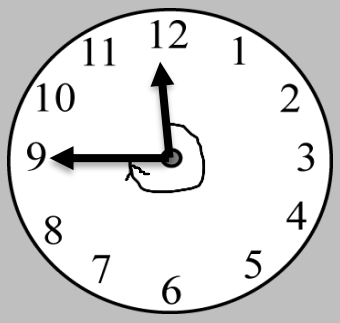
Two Right angle

(d) 10 to 1
Ans.



One Right angle

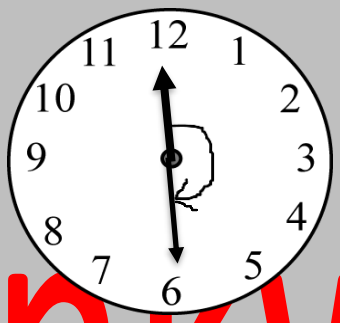
(e) 12 to 9
Ans.



Three Right angle

(f) 12 to 6

Ans.

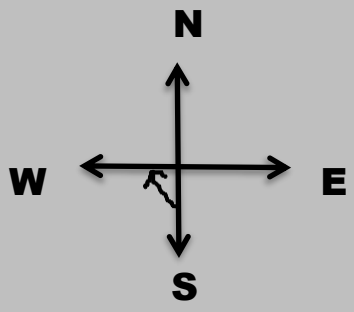


Two Right angle

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

(a) South and turn clockwise to west?

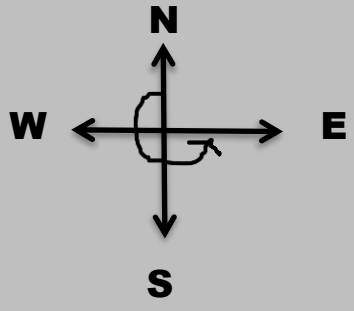
Ans.



One Right Angle

(b) North and turn anti-clockwise to east?

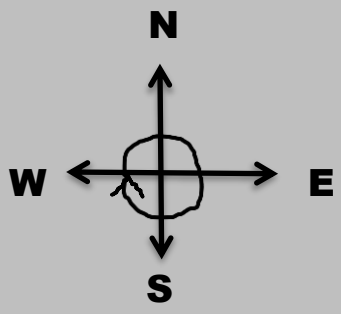
Ans.



Three Right Angle

(c) West and turn to west?

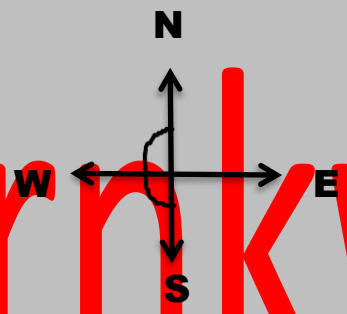
Ans.



Four Right Angle

(d) South and turn to north?

Ans.

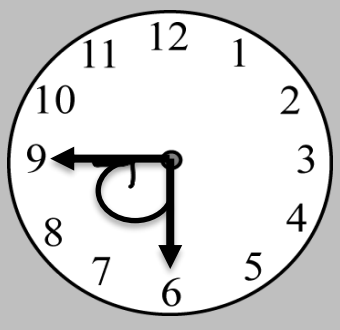


Two Right Angle

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

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

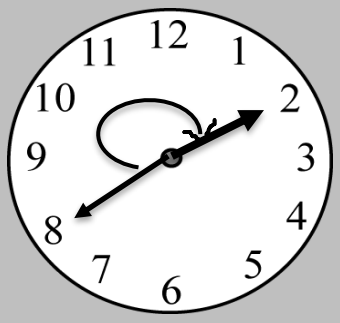
Ans.



The hour had stop at 9 if it starts from 6 and turn through one right angle.

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

Ans.



The hour had stop at 2 if it starts from 8 and turn through two right angle.

(c) From 10 and turns through 3 right angles?
Ans.

(d) From 7 and turns through 2 straight angles?
Ans.

The hour had stop at 7 if it starts from 7 and turn through two straight angles.

EXERCISE- 5.3

NCERT SOLUTION

1. Match the following:

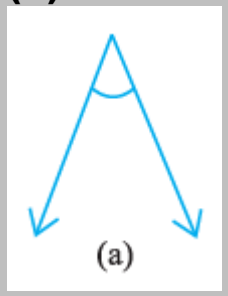
(i) Straight angle	**(a) Less than one-fourth of a revolution**
(ii) Right angle	**(b) More than half a revolution**
(iii) Acute angle	**(c) Half of a revolution**
(iv) Obtuse angle	**(d) One-fourth of a revolution**
(v) Reflex angle	**(e) $\frac{1}{4}$ and $\frac{1}{2}$ of a revolution**
	(f) One complete revolution

Ans.

(i) Straight angle	(c) Half of a revolution
(ii) Right angle	(d) One-fourth of a revolution
(iii) Acute angle	(a) Less than one-fourth of a revolution
(iv) Obtuse angle	(e) $\frac{1}{4}$ and $\frac{1}{2}$ of a revolution
(v) Reflex angle	(b) More than half a revolution

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

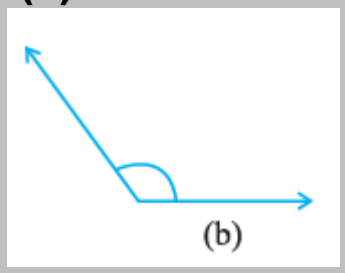
(a)



Ans.

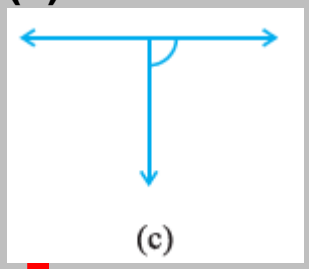
Acute angle

(b)



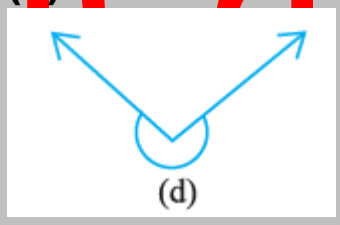
Ans.
Obtuse angle

(c)



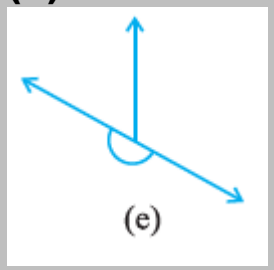
Ans.
Right angle

(d)



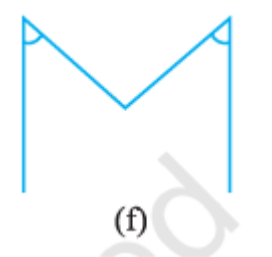
Ans.
Reflex angle

(e)



Ans.
Straight angle

(f)



Ans.

Acute Angles

EXERCISE- 5.4

NCERT SOLUTION

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

Ans.

(i) The measure of a right angle is 90°

(ii) The measure of a straight angle is 180°

2. Say True or False:

(a) The measure of an acute angle < 90°.

Ans.

True

(b) The measure of an obtuse angle < 90°.

Ans.

False

(c) The measure of a reflex angle > 180°.

Ans.

True

(d) The measure of one complete revolution = 360°.

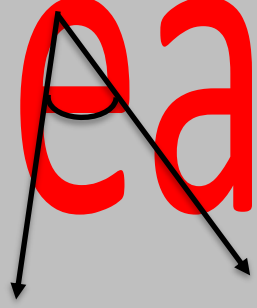
Ans.
True

(e) If m∠A = 53° and m∠B = 35°, then m∠A > m∠B.
Ans.
True

3. Write down the measures of (a) some acute angles. (b) Some obtuse angles. (Give at least two examples of each).
Ans.
(a) The measure of an acute angle are 56°, 39°
(b) The measure of an obtuse angle are 125°, 170°

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

(a)



Ans.

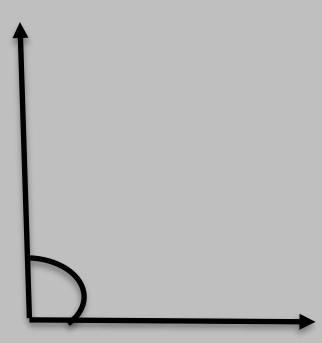
45°

(b)

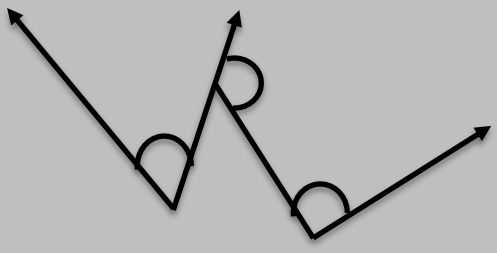
Ans.

120°

(c)



(d)



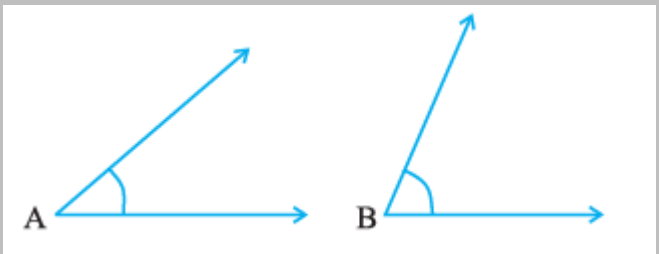
Ans.

90°

Ans.

60°, 130° and 90°

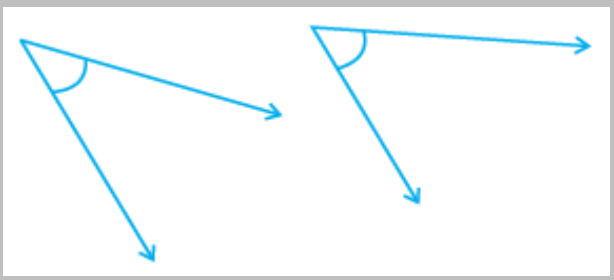
5. Which angle has a large measure?
First estimate and then measure.
Measure of Angle A =
Measure of Angle B =



Ans.

Measure of Angle A = 40°
Measure of Angle B = 68°

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



Ans.

Measure of these two angles are 45° and 55°. From these two second one is largest.

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 acute angle**.**

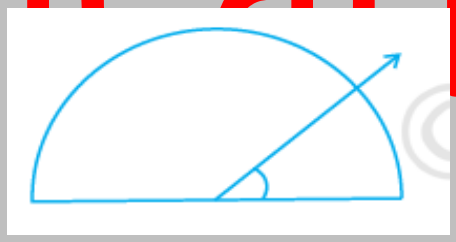
(b) An angle whose measure is greater than that of a right angle is Obtuse angle**.**

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

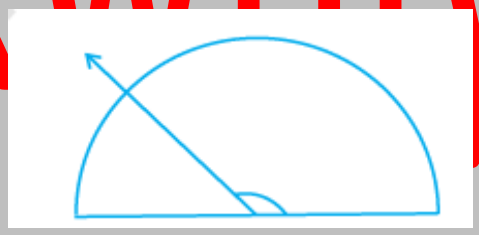
(d) When the sum of the measures of two angles is that of a right angle, then each one of them is acute angle**.**

(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**.**

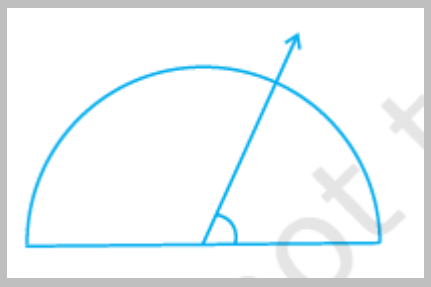
8. Find the measure of the angle shown in each figure. (First estimate with your eyes and then find the actual measure with a protractor).



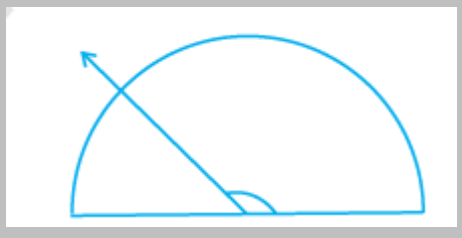
Ans.
40°



Ans.
135°



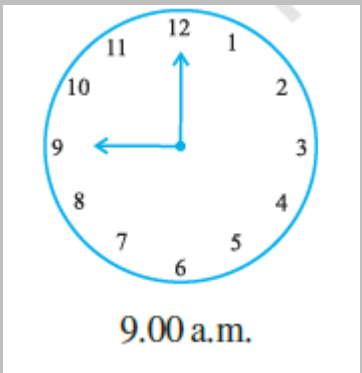
Ans.
65°



Ans.
135°

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

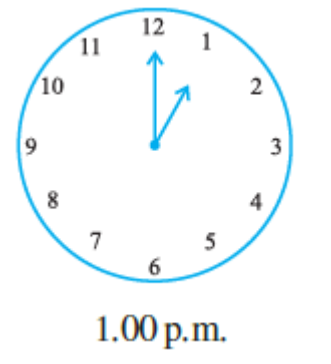
(i)



Ans.

90°

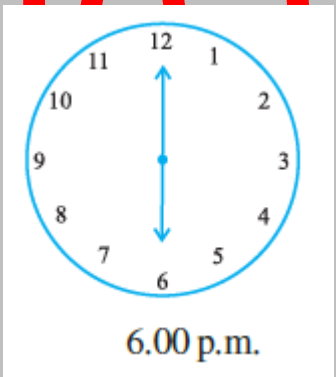
(ii)



Ans.

30°

(iii)

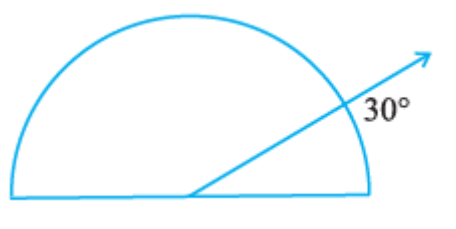


Ans.

180°

10. Investigate

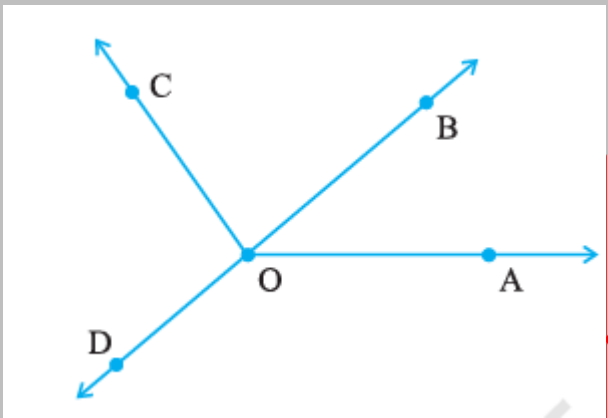
In the given figure, the angle measures 30°. Look at the same figure through a magnifying glass. Does the angle becomes larger? Does the size of the angle change?



Ans.

The measure of an angle will not change even by viewing through magnifying glass.

11. Measure and classify each angle:



Ans.

Angle	Measure	Type
∠AOB	40°	Acute Angle
∠AOC	125°	Obtuse Angle
∠BOC	85°	Acute Angle
∠DOC	95°	Obtuse Angle
∠DOA	140°	Obtuse Angle
∠DOB	180°	Straight Angle

EXERCISE- 5.5

NCERT SOLUTION

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

(a) The adjacent edges of a table top.

Ans.

Yes, the adjacent edges of a table top are perpendicular to each other.

(b) The lines of a railway track.

Ans.

No, the lines of a railway track are parallel to each other.

(c) The line segments forming the letter 'L'.

Ans.

Yes, the line segment forming letter 'L' are perpendicular to each other.

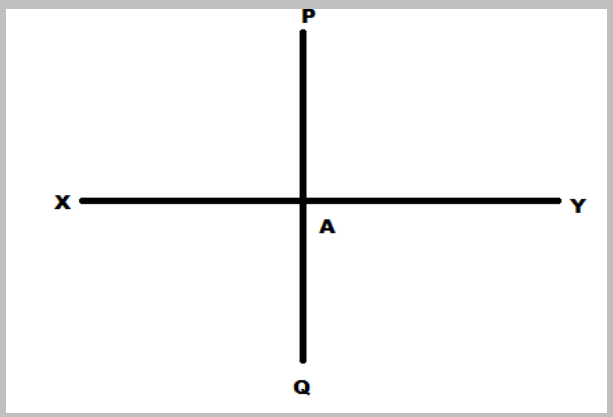
(d) The letter V.

Ans.

No, the letter V will form an acute angle.

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

Ans.



The measure of ∠PAY = 90°

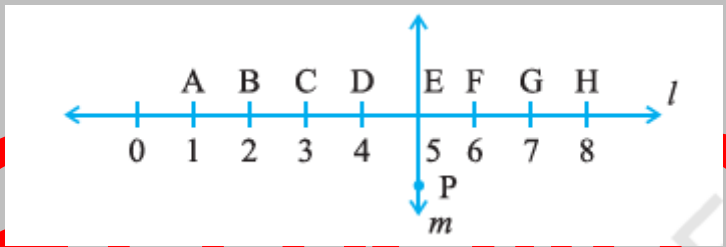
3. There are two set-squares in your box. What are the measures of the angles that are formed at their corners? Do they have any angle measure that is common?

Ans.

The measure of angle in one set square = 30°, 30°, 90°.
The measure of angle in other set square = 45°, 45°, 90°.

Yes, the angle of measure 90° is common in both the set square.

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



(a) Is CE = EG?

Ans.

Yes, CE = EG (CE = 2unit and EG =2units).

(b) Does PE bisect CG?

Ans.

Yes, PE bisect CG

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

Ans.

$\overline{DF}$ and $\overline{CG}$ are the two-line segments for which PE is the perpendicular bisector

(d) Are these true?
(i) AC > FG
Ans. Yes

(ii) CD = GH
Ans. Yes

(iii) BC < EH.

Ans. Yes

EXERCISE- 5.6

NCERT SOLUTION

1. Name the types of following triangles:
(a) Triangle with lengths of sides 7 cm, 8 cm and 9 cm.
Ans.
Scalene Triangle.

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

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

Equilateral Triangle

(d) ΔDEF with m∠D= 90°

Ans.

Right Angled Triangle

(e) ΔXYZ with m∠Y= 90° and XY = YZ.

Ans.

Right Angled Isosceles triangle

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

Ans.

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

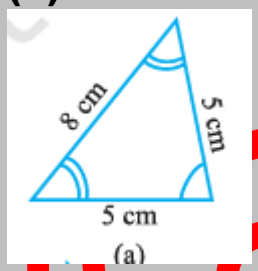
Ans.

Measures of Triangle	Type of Triangle
(i) 3 sides of equal length	(e) Equilateral
(ii) 2 sides of equal length	(g) Isosceles
(iii) All sides are of different length	(a) Scalene

(iv) 3 acute angles	(f) Acute angled
(v) 1 right angle	(d) Right angled
(vi) 1 obtuse angle	(c) Obtuse angled
(vii) 1 right angle with two sides of equal length	(b) Isosceles right angled

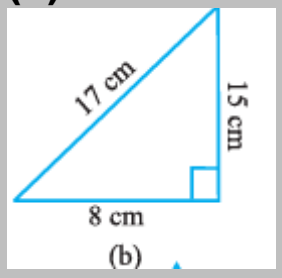
3. Name each of the following triangles in two different ways: (you may judge the nature of the angle by observation)

(a)



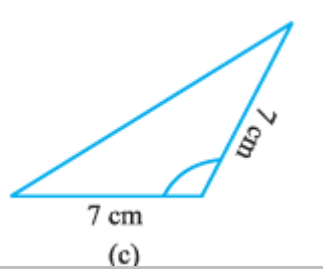
Ans.
Acute angled and Isosceles Triangle

(b)



Ans.
Right angled and Scalene Triangle

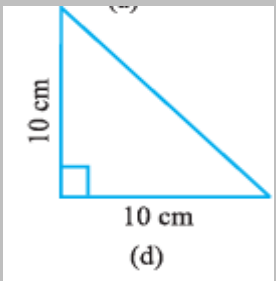
(c)



Ans.

Obtuse Angled and Isosceles Triangle

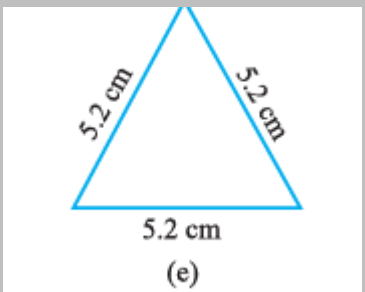
(d)



Ans.

Right angled and Isosceles Triangle

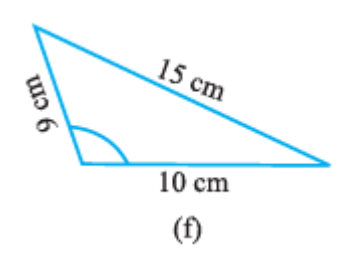
(e)



Ans.

Equilateral and Acute Angled Triangle

(f)

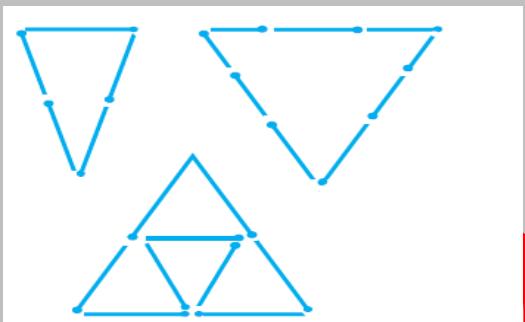


(f)

Ans.

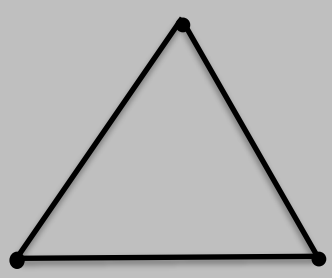
Obtuse Angled and Scalene Triangle

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
Ans

(a) 3 matchsticks

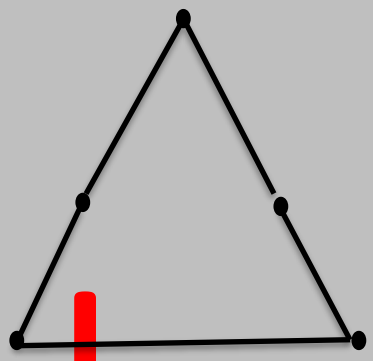


Yes, we can make equilateral triangle with 3 matchsticks.

(b) 4 matchsticks

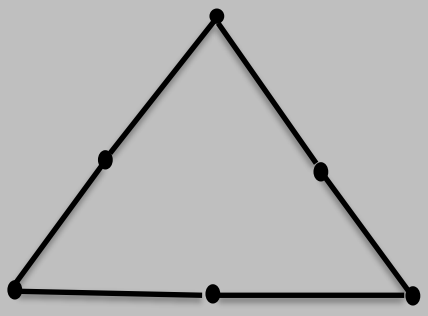
No, we cannot make triangle with 4 matchsticks.

(c) 5 matchsticks?



Yes we can make an isosceles triangle with 5 matchsticks.

(d) 6 matchsticks



Yes, we can make an equilateral triangle with 6 match sticks.

EXERCISE- 5.7

NCERT SOLUTION

1. Say True or False:
(a) Each angle of a rectangle is a right angle.
Ans.
True

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

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

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

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

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

2. Give reasons for the following:

(a) A square can be thought of as a special rectangle.
Ans.
A rectangle with all sides equal becomes a square.

(b) A rectangle can be thought of as a special parallelogram.
Ans.
A parallelogram with each angle a right angle becomes a rectangle.

(c) A square can be thought of as a special rhombus.
Ans.
Rhombus with each angle a right angle becomes a square

(d) Squares, rectangles, parallelograms are all quadrilaterals.
Ans.
Squares, rectangles, parallelograms are all quadrilaterals as they all are four sides polygons.

(e) Square is also a parallelogram.
Ans.
The opposite side of square are parallel then it is a parallelogram

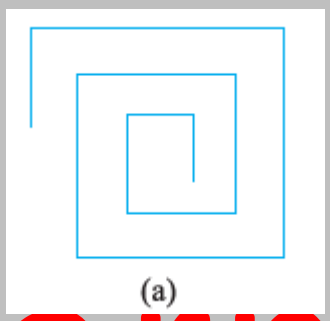
3. A figure is said to be regular if its sides are equal in length and angles are equal in measure. Can you identify the regular quadrilateral?
Ans.
Square is the only regular quadrilateral whose sides are equal in length and angles are equal in measure.

EXERCISE- 5.8

NCERT SOLUTION

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

(a)

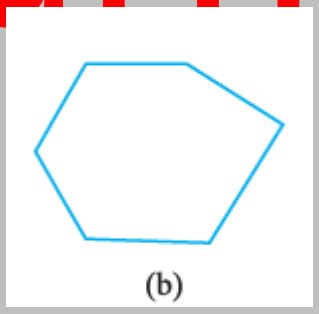


(a)

Ans.

No, this figure is not a polygon because it is not a closed figure.

(b)

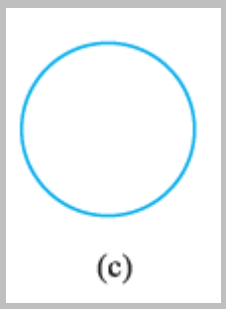


(b)

Ans.

The given figure is a polygon of six sides.

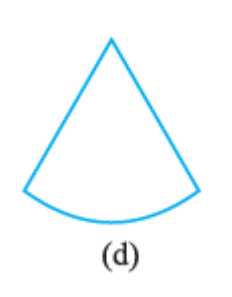
(c)



(c)

Ans.
The given figure is not a polygon as it is not made of line segment.

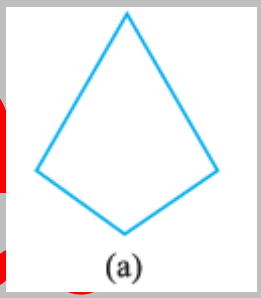
(d)



Ans.
The given figure is not a polygon as it is not made of line segment.

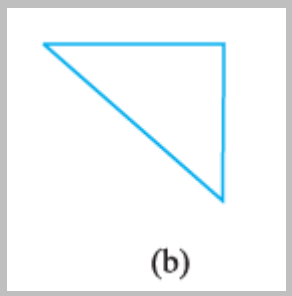
2. Name each polygon.

(a)



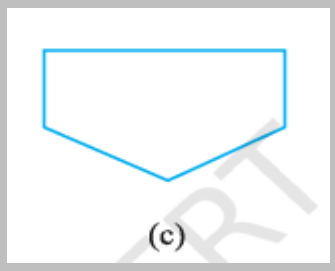
Ans.
A Quadrilateral

(b)



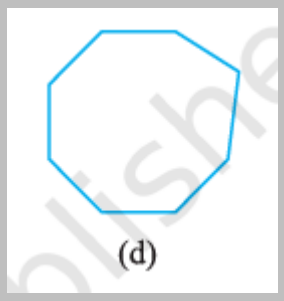
Ans.
A Triangle

(c)



Ans.
A Pentagon

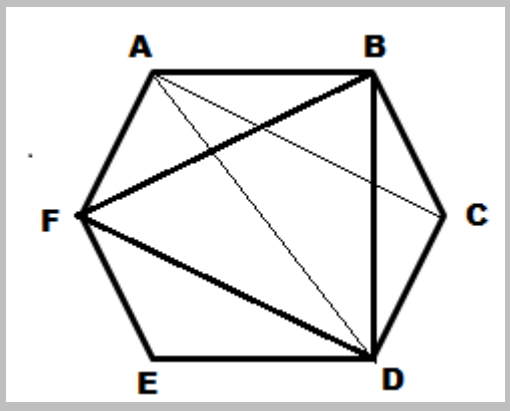
(d)



Ans.
An Octagon

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.

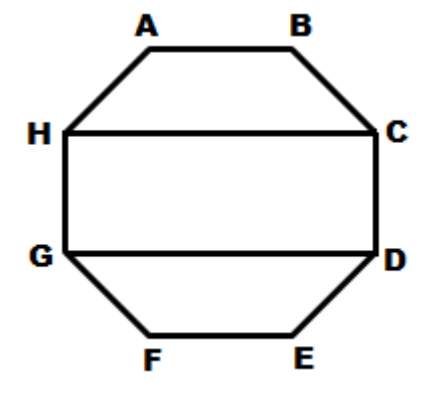
Ans.



ABCDEF is a regular hexagon. If we connect 3 vertices A, C and D we will get a scalene triangle ACD.
But if we connect F, B and D we will get an equilateral triangle ABD.

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.

Ans.

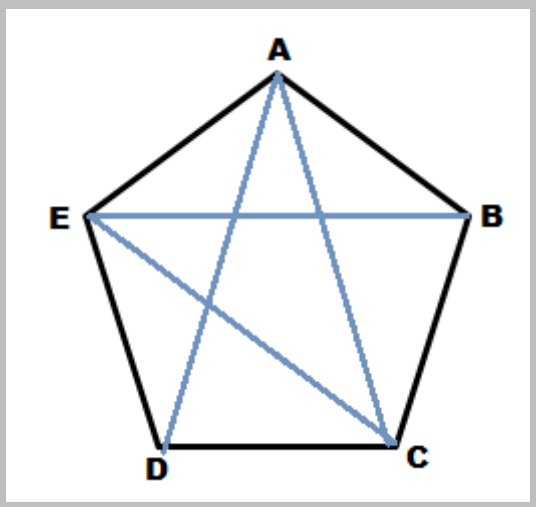


ABCDEFGH is a regular octagon. GDCH is a rectangle formed by joining 4 vertices of the given octagon.

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.

Ans.

Rough sketch of a pentagon with its diagonals.



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