BAL BHARATI PUBLIC SCHOOL, PITAMPURA, DELHI-110034

WEEK: 21st - 25th December , 2020
SUBJECT: MATHEMATICS
CLASS: VII
NUMBER OF BLOCKS: 3
TOPIC: CHAPTER 7 : **CONGRUENCE OF TRIANGLES (Part – 2)**
CHAPTER 10 **:** **Practical Geometry (Part – 1)**

GUIDELINES

Dear students kindly refer to the following notes / video links for the chapter.

"**Congruence of Triangles**" and " **Practical Geometry** " thereafter do the questions in your Maths notebook .

NOTE – STUDENTS CAN GO THROUGH THE CHAPTER

1) ***"Congruence of Triangles" USING THE FOLLOWING LINK***

https://ncert.nic.in/ncerts/l/gemh107.pdf

2) " **Practical Geometry** " ***" USING THE FOLLOWING LINK***

https://ncert.nic.in/textbook/pdf/gemh110.pdf

SUBTOPICS:

- CRITERIA FOR CONGRUENCE OF TRIANGLES
- APPLICATION OF THESE CRITERIA FOR FINDING CONGRUENT TRIANGLES
- CONSTRUCTION OF TRIANGLES USING SSS CONDITION
- CONSTRUCTION OF TRIANGLES USING SAS CONDITION

TEACHING AIDS USED

- Power point presentations, PDF documents, videos and digital white boards with the help of screen presentation.
- Explaining on white board with marker (showing with the help of device's camera).
- ROBOCOMPASS for teaching of construction of triangles.

LEARNING OBJECTIVES:

Each student will be able to:

- **Recognize congruent triangles and also classify them in different congruence relations – SSS, SAS, ASA, RHS.**
- **Construct triangle using SSS condition ie when three sides of a triangle are given.**

- **Construct triangle using SAS condition ie when two sides and included angle of a triangle are given.**

BLOCK – 1

LESSON DEVELOPMENT

Recall the congruence criteria for identifying whether the given triangles are congruent or not :

1) **SSS Congruence criteria**
2) **SAS Congruence criteria**
3) **ASA Congruence criteria**
4) **RHS Congruence criteria**

The following questions will be done during online session:

EXERCISE 7.2

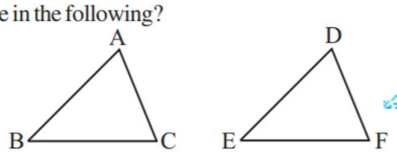
1. Which congruence criterion do you use in the following?

(a) **Given:** AC = DF

AB = DE

BC = EF

So, $\Delta ABC \cong \Delta DEF$

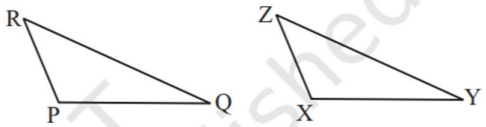


(b) **Given:** ZX = RP

RQ = ZY

$\angle PRQ = \angle XZY$

So, $\Delta PQR \cong \Delta XYZ$

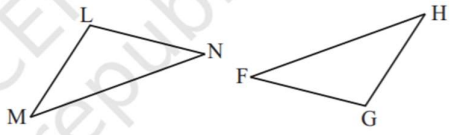


(c) **Given:** $\angle MLN = \angle FGH$

$\angle NML = \angle GFH$

ML = FG

So, $\Delta LMN \cong \Delta GFH$

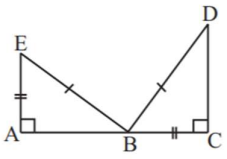


(d) **Given:** EB = DB

AE = BC

$\angle A = \angle C = 90°$

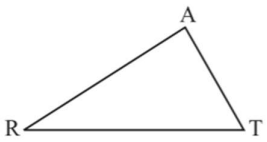
So, $\Delta ABE \cong \Delta CDB$



2. You want to show that $\Delta ART \cong \Delta PEN$,

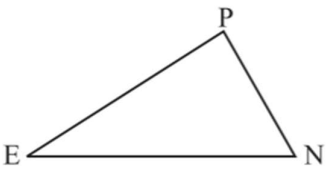
(a) If you have to use SSS criterion, then you need to show

(i) AR = (ii) RT = (iii) AT =



(c) If it is given that AT = PN and you are to use ASA criterion, you need to have

(i) ? (ii) ?



4. In ΔABC, $\angle A = 30°$, $\angle B = 40°$ and $\angle C = 110°$

In ΔPQR, $\angle P = 30°$, $\angle Q = 40°$ and $\angle R = 110°$

A student says that $\Delta ABC \cong \Delta PQR$ by AAA congruence criterion. Is he justified? Why or why not?

Students can refer to the following link for congruence of triangles:

https://www.youtube.com/watch?v=U7SDnAnnFU8

Home Assignment: Ex 7.2 Q.2.(b), Q.3 , Q.5

(Please note Q.6 , Q.7 , Q.8 ,Q.9 , Q.10 of EX.10.2 have been deleted this year from syllabus)

BLOCK – 2

LESSON DEVELOPMENT

Practical Geometry

CONSTRUCTION OF TRIANGLES

You know how triangles are classified based on sides or angles and the following important properties concerning triangles:

(i) The exterior angle of a triangle is equal in measure to the sum of interior opposite angles.

(ii) The total measure of the three angles of a triangle is 180°.

(iii) Sum of the lengths of any two sides of a triangle is greater than the length of the third side.

In the chapter on 'Congruence of Triangles', we saw that a triangle can be drawn if any one of the following sets of measurements are given:

(i) Three sides.

(ii) Two sides and the angle between them.

(iii) Two angles and the side between them.

(iv) The hypotenuse and a leg in the case of a right-angled triangle.

We will now attempt to use these ideas to construct triangles.

Constructing a Triangle when the Lengths of its Three Sides are Known (SSS Criterion)

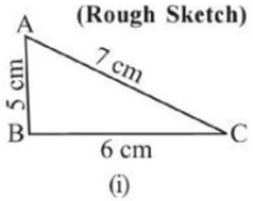
In this section, we would construct triangles when all its sides are known. We draw first a rough sketch to give an idea of where the sides are and then begin by drawing any one of

the three lines. See the following example:

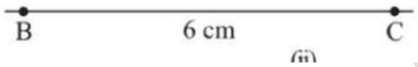
EXAMPLE 1 Construct a triangle ABC, given that AB = 5 cm, BC = 6 cm and AC = 7 cm.

SOLUTION

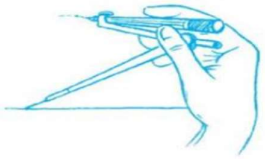
Step 1 First, we draw a rough sketch with given measure, (This will help us in deciding how to proceed) [Fig 10.3(i)].

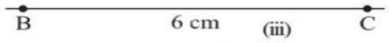


Step 2 Draw a line segment BC of length 6 cm [Fig 10.3(ii)].

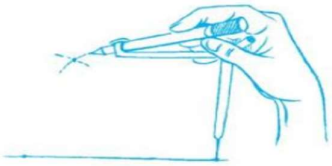


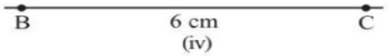
Step 3 From B, point A is at a distance of 5 cm. So, with B as centre, draw an arc of radius 5 cm. (Now A will be somewhere on this arc. Our job is to find where exactly A is) [Fig 10.3(iii)].





Step 4 From C, point A is at a distance of 7 cm. So, with C as centre, draw an arc of radius 7 cm. (A will be somewhere on this arc, we have to fix it) [Fig 10.3(iv)].





Step 5 A has to be on both the arcs drawn. So, it is the point of intersection of arcs. Mark the point of intersection of arcs as A. Join AB and AC. ΔABC is now ready [Fig 10.3(v)].

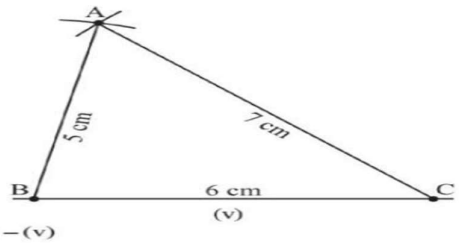


Fig 10.3 (i) – (v)

The following questions will be discussed during online session:

EXERCISE 10.2

1. Construct ΔXYZ in which XY = 4.5 cm, YZ = 5 cm and ZX = 6 cm.
2. Construct an equilateral triangle of side 5.5 cm.

(The following question is from NCERT Exemplar)

3 . A triangle can be constructed by taking its sides as:

(a) 1.8 cm, 2.6 cm, 4.4 cm (b) 2 cm, 3 cm, 4 cm

(c) 2.4 cm, 2.4 cm, 6.4 cm (d) 3.2 cm, 2.3 cm, 5.5 cm

HOME ASSIGNMENT: EX. 10.2 Q.3, Q.4.

(Please Note that EX.10.1 based on construction of parallel lines has been deleted from syllabus this year)

Students can refer to the following link for construction of triangles:

https://www.youtube.com/watch?v=ib5idXrq5jg

https://www.youtube.com/watch?v=UzNWf737nNk

BLOCK – 3

LESSON DEVELOPMENT

Students to recall the steps of construction for angles which are multiples of 15^0 using a compass, eg : 30^0 , 60^0 , 45^0 , 90^0 , 120^0

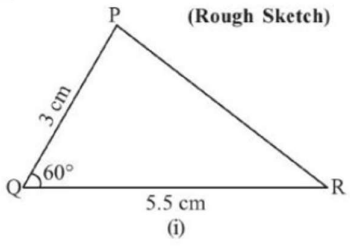
CONSTRUCTING A TRIANGLE WHEN THE LENGTHS OF TWO SIDES AND THE MEASURE OF THE ANGLE BETWEEN THEM ARE KNOWN. (SAS CRITERION)

Here, we have two sides given and the one angle between them. We first draw a sketch and then draw one of the given line segments. The other steps follow. See Example 2.

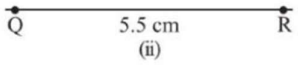
EXAMPLE 2 Construct a triangle PQR, given that PQ = 3 cm, QR = 5.5 cm and ∠PQR = 60°.

SOLUTION

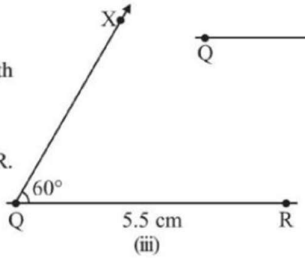
Step 1 First, we draw a rough sketch with given measures. (This helps us to determine the procedure in construction) [Fig 10.5(i)].



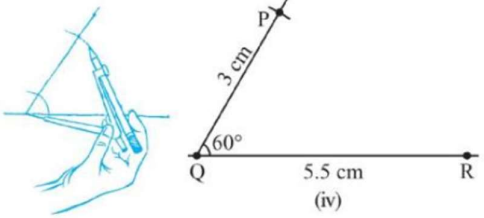
Step 2 Draw a line segment QR of length 5.5 cm [Fig 10.5(ii)].



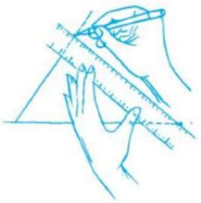
Step 3 At Q, draw QX making 60° with QR. (The point P must be somewhere on this ray of the angle) [Fig 10.5(iii)].

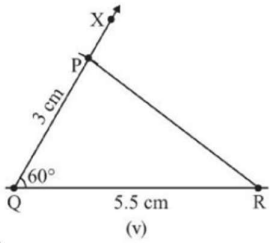


Step 4 (To fix P, the distance QP has been given).
With Q as centre, draw an arc of radius 3 cm. It cuts QX at the point P [Fig 10.5(iv)].



Step 5 Join PR. ΔPQR is now obtained (Fig 10.5(v)).





(v)

Fig 10.5 (i) – (v)

The following questions will be done during online session :

EXERCISE 10.3

1. Construct ΔDEF such that DE = 5 cm, DF = 3 cm and m∠EDF = 90°.
2. Construct an isosceles triangle in which the lengths of each of its equal sides is 6.5 cm and the angle between them is 110°.

(The following question is from NCERT Exemplar)

3. Construct a right-angled triangle whose hypotenuse measures 5 cm and one of the other sides measures 3.2 cm.

HOME ASSIGNMENT: EX 10.3 Q.3.

Students can refer to the following link for construction of triangles:

https://www.youtube.com/watch?v=X5JvadWVWf4

SUMMARY

CONGRUENCE OF TRIANGLES

SSS Congruence of two triangles:

Under a given correspondence, two triangles are congruent if the three sides of the one are equal to the three corresponding sides of the other.

SAS Congruence of two triangles:

Under a given correspondence, two triangles are congruent if two sides and the angle included between them in one of the triangles are equal to the corresponding sides and the angle included between them of the other triangle.

ASA Congruence of two triangles:

Under a given correspondence, two triangles are congruent if two angles and the side included between them in one of the triangles are equal to the corresponding angles and the side included between them of the other triangle.

RHS Congruence of two right-angled triangles:

Under a given correspondence, two right-angled triangles are congruent if the hypotenuse and a leg of one of the triangles are equal to the hypotenuse and the corresponding leg of the other triangle.

There is no such thing as AAA Congruence of two triangles:

Two triangles with equal corresponding angles need not be congruent. In such a correspondence, one of them can be an enlarged copy of the other. (They would be congruent only if they are exact copies of one another).

PRACTICAL GEOMETRY (Construction of triangles)

We studied the method of drawing a triangle, using indirectly the concept of congruence of triangles.

The following cases were discussed:

(i) SSS: Given the three side lengths of a triangle.

(ii) SAS: Given the lengths of any two sides and the measure of the angle between these sides.

ACTIVITY

Find the measure of missing angles by applying the properties of triangles and paste this worksheet in your CW/HW notebooks.

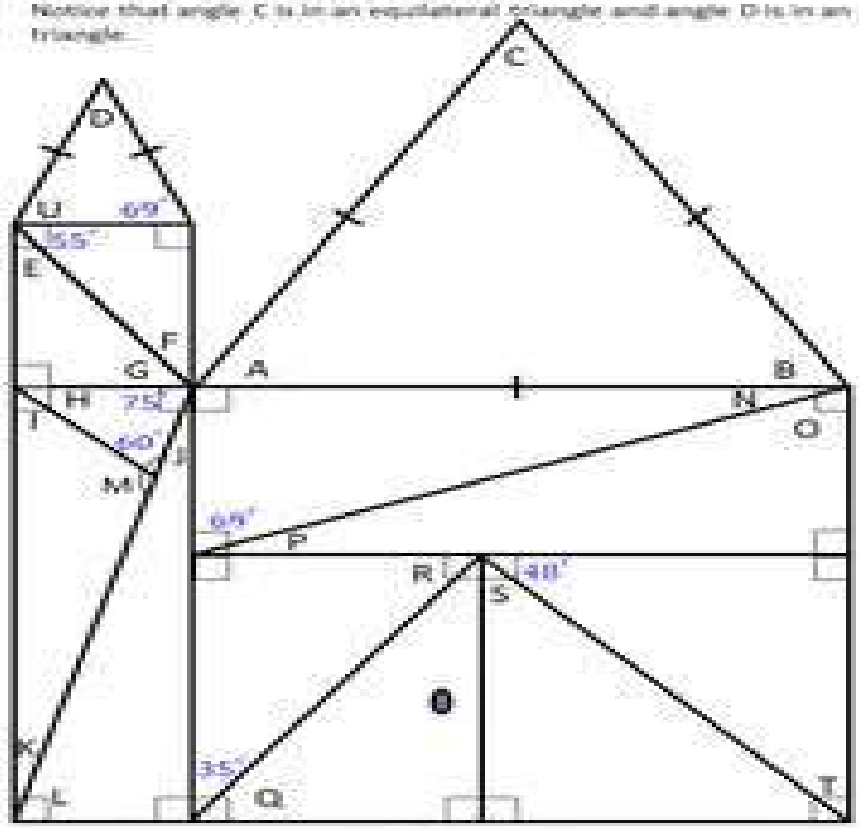
Name:_____ Date:_____

Missing Angles in Triangles

The sum of the angles of any triangle is _____.

Find all the missing Angles in the triangles. Write each answer in the line provided beside the corresponding letter.

Notice that angle C is in an equilateral triangle and angle D is in an isosceles triangle.



A _____
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