SHIKSHA CLASSES

Sub : Maths **Answer Paper** **Total Marks : 30**

Class : IX (CBSE) **7. Triangles**

Section A (Each 1 Marks)

Multiple Choice Questions. (MCQs)

Q.1 : Which of the following is not a criterion for congruence of triangles.

Ans : b) SSA

Q.2 : Two equilateral triangles are congruent when :

Ans : b) their sides are equal

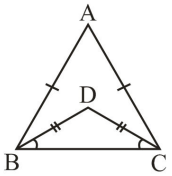
Q.3 : If one angle of a triangle is equal to the sum of the other two angles then triangle is

Ans : d) a right angled triangle

Q.4 : In ΔABC $\triangle ABC \cong \triangle FDE$ and AB = 5 cm, $\angle B = 40^0, \angle A = 80^0$. Then which of the following is true?

Ans : c) DF = 5 cm, $\angle E = 60^0$

Q.5 : In fig., the ratio $\angle ABD : \angle ACD$ is



Ans : a) 1 : 1

Q.6 : If E and F are the midpoints of equal sides AB and AC of a triangle ABC. Then:

Ans : d) BF = CE

Q.7 : If ABC and DBC are two isosceles triangles on the same base BC. Then:

Ans : a) $\angle ABD = \angle ACD$

Q.8 : In triangle ABC, if AB=BC and $\angle B = 70$, $\angle A$ will be:

Ans : c) 55

Q.9 : A triangle in which two sides are equal is called:

Ans : c) Isosceles triangle

For question number 10 to 11 two statement are given one labeled Assertion and other labeled Reason select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below

Q.10 : Assertion: Two angles measures a – 60° and 123° – 2a. If each one is opposite to equal sides of an isosceles triangle, then the value of a is 61°.

Reason: Sides opposite to equal angles of a triangle are equal.

Ans: b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

Q.11 : Assertion : Angles opposite to equal sides of a triangle are not equal.

Reason : Sides opposite to equal angles of a triangle are equal.

Ans : d) Assertion (A) is false but reason (R) is true.

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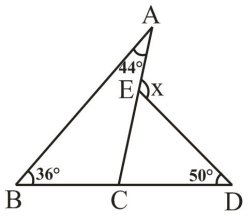
Section B (Each 2 Marks)

Q.12 : Find x in fig.



Ans : In figure,

$\angle ECD$ is an exterior angle of ΔABC

$\therefore \angle ECD = 36° + 44°$

$\Rightarrow \angle ECD = 80°$ ..... (i)

In ΔCED, x is an exterior angle of ΔCDE

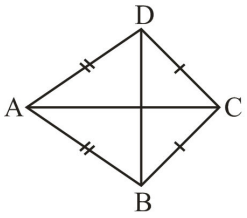
$\therefore x = \angle ECD + 50$

$\Rightarrow x = 80 + 50$ .... (from (i))

$\Rightarrow x = 130$

Q.13 : In fig. ΔABD and ΔBCD are isosceles triangle on same base BD.

Prove that $\angle ABC = \angle ADC$.



Ans : ΔABD is an isosceles triangle

$\therefore \angle ABD = \angle ADB$ ..... (i)

Also, ΔCBD is an isosceles triangle.

$\therefore \angle CBD = \angle CDB$ ..... (ii)

Adding equation (i) and (ii)

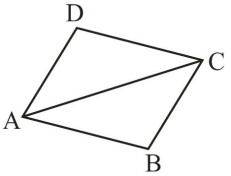
$\angle ABD + \angle CBD = \angle ADB + \angle CDB$

$\Rightarrow \angle ABC = \angle ADC$ ..... Proved.

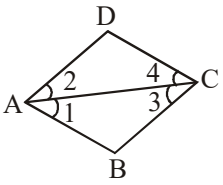
OR

In fig. the diagonal AC of quadrilateral ABCD bisects $\angle BAD$ and $\angle BCD$.

Prove that BC = CD.



Ans : In figure,



AC bisects $\angle A$ and $\angle C$

i.e. $\angle 1 = \angle 2$ ... (i) and $\angle 3 = \angle 4$ .... (ii)

In ΔABC and ΔADC

$\angle 1 = \angle 2$ ... (From (i))

$\angle 3 = \angle 4$ ... (From (ii))

AC = AC ..... (Common)

So, $\Delta ABC \cong \Delta ADC$ .... (ASA test)

Hence, BC = CD .... (CPCT) proved.

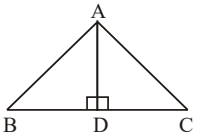
Section C (Each 3 marks)

Q.14 : AD is an altitude of an isosceles triangle ABC in which AB = AC. Show that AD bisects BC

Ans : AD is the altitude drawn from vertex A of an isosceles

ΔABC to the opposite base

BC so that AB = AC,



$\angle ADC = \angle ADB = 90°$

Now, In triangles ADB and ADC we have,

AB = AC ..... (given)

AD = AD ..... (common)

$\angle ADB = \angle ADC$ ..... (each 90°)

By RHS criterion of congruence, we have

$\Delta ADB \cong \Delta ADC$

$\therefore$ BD = DC

$\therefore$ AD bisects BC

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OR

$\triangle ABC$ is an isosceles triangle with AB = AC. Side BA is produced to D such that AB = AD. Prove that $\angle BCD$ is a right angle.

Ans : $AB = AC$ and $AB = AD$ ... (given)

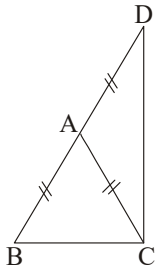
$\therefore\ AB = AC = AD$

In $\triangle ABC$,

$AB = AC$ ...(given)

$\therefore\ \angle ABC = \angle ACB$

...(angle opposite to equal sides)



Let $\angle ABC = \angle ACB = x$ ...(i)

Similarly,

In $\triangle ADC$,

$AC = AD$. ..(given)

$\angle ACD = \angle ADC$

...(angle opposite to equal sides)

$\therefore\ \angle ACD = \angle ADC = y$ ...(ii)

In $\triangle BCD$,

$\angle B + \angle BCD + \angle D = 180^0$

...(Angle sum property of a triangle)

$\therefore \angle ABC + (\angle ACB) + \angle ACD) + \angle ADC = 180^0$

$\therefore x + (x + y) + y = 180^0$ ...[from (i) & (ii)]

$\therefore 2x + 2y = 180^0$

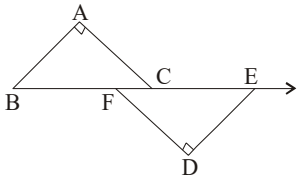
$\therefore 2(x + y) = 180^0$

$\therefore\ x + y = 90^0$

$\therefore \angle BCD = 90^0$

$\angle BCD$ is a right angle triangle.

Q.15 : In fig., $BA \perp AC, DE \perp DF$ such that BA = DE and BF = EC. Show that $\triangle ABC \cong \triangle DEF$.



Ans : BF = EC...(given)

adding FC to both sides

$\therefore BF + FC = EC + FC$

$\therefore BC = EF$ ...(i)

In $\triangle ABC$ and $\triangle DEF$,

$\angle BAC = \angle EDF$ ...(each 90^0)

hypo. BC = hypo. EF ...[from (i)]

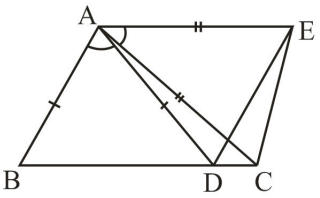
BA = DE ...(given)

$\therefore \triangle ABC \cong \triangle DEF$

...(hypotenuse side criteria)

Section - D

Q.16 : In fig., AC = AE, AB = AD and $\angle BAD = \angle EAC$. Show that BC = DE.



Ans : In ΔABC and ΔADE

$AB = AD$ ..... (given)

$AC = AE$ .... (given)

$\angle BAC = \angle DAE$ ($\because \angle BAD = \angle CAE$

$\Rightarrow \angle BAD + \angle DAC = \angle CAE + \angle DAC$

$\Rightarrow \angle BAC = \angle DAE$)

$\therefore$ By SAS criterion of congruence, we have

$\Delta ABC \cong \Delta ADE$

$\Rightarrow BC = DE$ .... (CPCT)

OR

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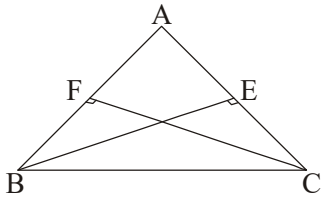
BE and CF are two equal altitudes of a triangle ABC. Using RHS congruence rule prove that the triangle ABC is isosceles.

Ans : In ΔBCF and ΔCBE, we have

∠BFC = ∠CEB .... (Each 90°)

BC = BC ..... (common)

CF = BE ..... (given)



∴ By RHS criterion of congruence, we have

Δ BCF ≅ ΔCBE

So, FBC = ECB .... [CPCT]

Now, In ΔABC,

∠ABC = ∠ACB .... [∵ ∠FBC = ∠ECB]

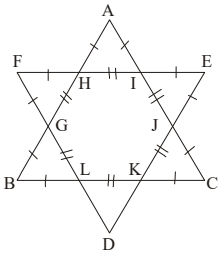
∴ AB = AC [∵ side opposite to equal angles of a triangle are equal]

∴ ΔABC is an isosceles triangle.

SECTION - E

Q.17 : Case Study : (Any Four) 4

Rashmi made a star-shaped lantern for Diwali, by using two congruent equilateral triangles ABC and DEF as shown below.



Now using the information given answer the following questions.

i) Triangles ABC and DEF can be proved congruent using

Ans : b) SSS rule

ii) Triangle AIH is congruent to triangle...

Ans : a) EIJ

iii) ∠DLK is equal to...

Ans : b) ∠BLG

iv) m∠BLD = ...

Ans : b) ∠DKL + ∠LDK

v) Which of the following is not a test of congruency for two triangles ?

Ans : c) AAA

* * *

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