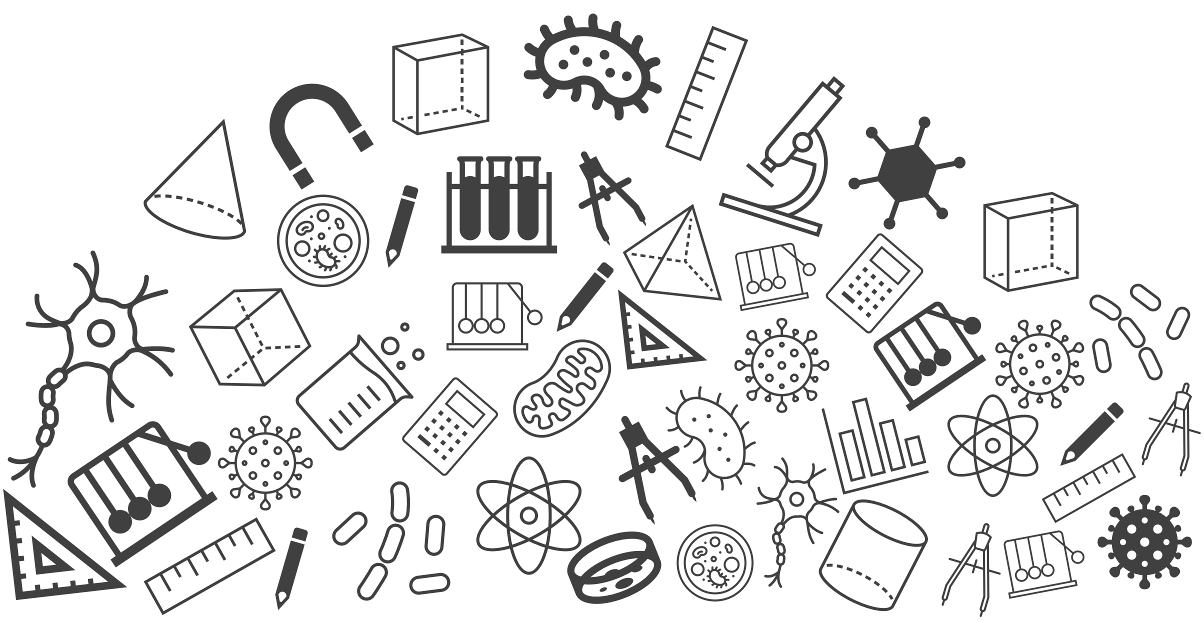
Grade 09: Maths
Exam Important Questions



Triangles

Topic : Exam Important Questions

1. "Two triangles of equal area may not be congruent." Justify this statement.
[2 Marks]
[Congruency]

Solution:

Two triangles will be congruent if they have the same shape and size.
(1 Mark)

It is possible that two triangles of different measurements have the same area. But, in this case, the triangles are not congruent, as the corresponding sides and angles of the two triangles are not equal.
(1 Mark)

Thus, two triangles of equal area may not be congruent.

2. If $\Delta PQR \cong \Delta EDF$, then is it true to say that $PR = EF$? Give reason for your answer.

(1 Mark)

Solution:
Yes, if two triangles are congruent, then the corresponding angles and sides of the two triangles will be equal.

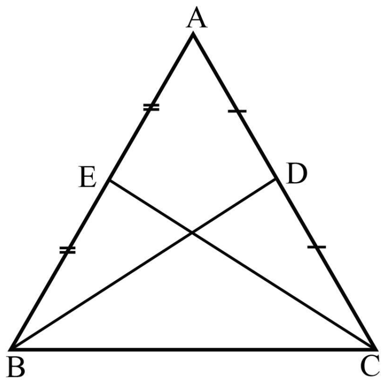
Here, $\Delta PQR \cong \Delta EDF$.
$\therefore PQ = ED, QR = DF$ and $PR = EF$.

Hence, it is true to say that $PR = EF$. $(1 Mark)$

3. In triangle ABC, AB = AC and BD, CE are its two medians. Show that BD = CE.

(3 Marks)

Solution:
Given that AB = AC and BD,CE are its two medians.



In ΔABD and ΔACE,

AB = AC [given]

$\angle A = \angle A$ [common angle]

And AD = AE

$[\because AB = AC \Rightarrow \frac{1}{2}AB = \frac{1}{2}AC \Rightarrow AE = AD]$

As D is the mid-point of AC and E is the mid-point of AB,

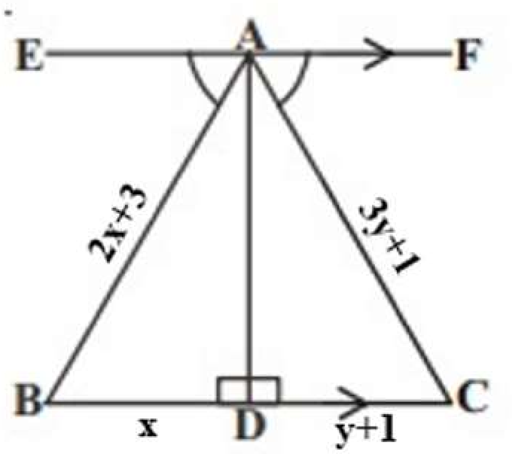
$\therefore \Delta ABD \cong \Delta ACE$

[by SAS congruence rule] (2 Marks)

$\Rightarrow BD = CE$ [by CPCT]

(1 Mark)

4. In the given figure, AD is perpendicular to BC and EF || BC, if ∠EAB=∠FAC, find the values of x and y.



[4 mark]
[NCERT Exemplar]
[AAS Congruence rule]

Solution:
Given that, EF || BC , and ∠EAB = ∠FAC, Consider the transversal AB and AC,
∠ABD = ∠EAB ….(i)(alternate interior angles)

∠ACD = ∠FAC ….(ii)(alternate interior angles)

From (i) and (ii), we get
∠ABD = ∠ACD.........(iii) [1 mark]

Now Consider ΔABD and ΔACD,
∠ABD = ∠ACD….(Proved)

∠ADB = ∠ADC = 90° …(Given)

AD = AD ….(common side)

Thus, ΔABD ≅ ΔACD….(AAS Congruence rule)

Now by CPCT rule, we can write that,

AB = AC ….(CPCT)
[1 mark]

2x + 3 = 3y + 1,

2x - 3y = 1 - 3,

2x - 3y = -2.......(iv)

BD = CD ….(CPCT)

x = y + 1,

x - y = 1…...(v)
[1 mark]

By solving eq(iv) and eq(v), we can easily find the value of x and y.

Substituting x = y + 1 in eq(iv),

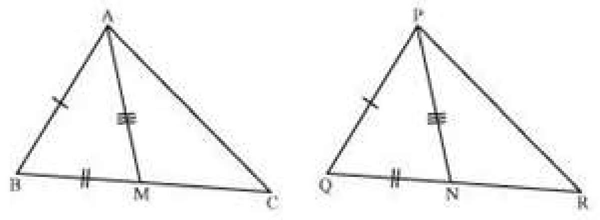
2(y + 1) - 3y = -2

2y + 2 - 3y = -2

y = 4

x = y + 1 = 4 +1 = 5
[1 mark]

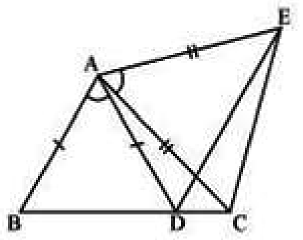
5. Two sides AB and BC and median AM of one triangle ABC are respectively equal to sides PQ and QR and median PN of ΔPQR (see the given figure). Show that:
$\Delta ABM \cong \Delta PQN$



(3 Marks)
[Properties of Isosceles Triangle]

In ΔABC, AM is the median to BC
$\therefore BM = \frac{1}{2}BC$
In ΔPQR, PN is the median to QR
$\therefore QN = \frac{1}{2}QR$
However BC = QR
(1 Mark)
$\Rightarrow$ BM = QN
In ΔABM and ΔPQN, we have
AB=PQ (Given)
AM=PN (Given)
BM = QN (Proved above)
$\therefore \Delta ABM \cong \Delta PQN$
(By SSS congruence rule)
(2 Marks)

6. In the given figure, AC = AE, AB = AD and $\angle BAD = \angle EAC$. Show that BC = DE.



[2 Marks]
[Congruency of Triangles]

Solution:

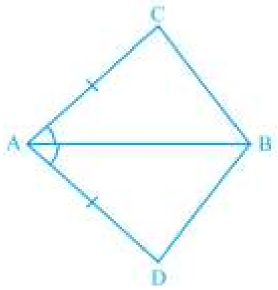
It is given that $\angle \mathrm{BAD} = \angle \mathrm{EAC}$
$\angle \mathrm{BAD} + \angle \mathrm{DAC} = \angle \mathrm{EAC} + \angle \mathrm{DAC}$ [Adding $\angle \mathrm{DAC}$ on both sides]
$\Rightarrow \angle \mathrm{BAC} = \angle \mathrm{DAE}$

[1 Mark]

$In\ \Delta BAC\ and\ \Delta DAE,$
$AB = AD\ \ (Given)$
$\angle BAC = \angle DAE\ \ (Proved\ above)$
$AC = AE\ \ (Given)$
$\therefore \Delta BAC \cong \Delta DAE\ \ (By\ SAS\ congruence\ rule)$
$\therefore BC = DE\ \ (By\ CPCT)$

[1 Mark]

7. In quadrilateral ACBD, AC = AD and AB bisects $\angle A$. Show that $\triangle ABC \cong \triangle ABD$. What can you say about BC and BD?



(3 Marks)
[Congruency]

Solution:

Given:
$AC = AD$
$\angle CAB = \angle DAB$ ($\because$ AB bisects $\angle A$)
(1 Mark)

Consider $\triangle ABC$ and $\triangle ABD$
$AC = AD$ (Given)
$\angle CAB = \angle DAB$ (Given)
$AB = AB$ (Common side)
By SAS Congruency, $\triangle ABC \cong \triangle ABD$
$BC = BD$ (By CPCT)
(2 Marks)

8. Choose the correct option and justify your answer.

Assertion: Two angles measures $a - 60^o$ and $123^o - 2a$. If each one is opposite to equal sides of an isosceles triangle, then the value of a is 61^o.

Reason: Angles opposite to the equal sides of a triangle are equal.

(a) Both assertion and reason are true and reason is the correct explanation of assertion.

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

(c) Assertion is true but reason is false.

(d) Assertion is false but reason is true.

[2 marks]
[Properties of Isosceles Triangle]

Solution:
We know that,
Angles oppsoite to the equal sides of a isoceles triangle are equal and vise-versa.

[1 mark]

Given that,
$a - 60^o$ and $123^o - 2a$ are angles opposite to the equal sides of an isosceles triangle.

Therefore,
$\Rightarrow a - 60^o = 123^o - 2a$

$\Rightarrow 3a = 183^o$

$\Rightarrow a = 61^o$

Hence, assertion is correct and reason is the correct explanation for the assertion.

[1 mark]