Triangles

Assertion & Reason Type Questions

In the following questions given below, there are two statement marked as Assertion (A) and Reason (R). Read the statements and choose the correct option:

a. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

b. Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A)

c. Assertion (A) is true but Reason (R) is false

d. Assertion (A) is false but Reason (R) is true

Q 1. Assertion (A): All regular polygons of the same number of sides such as equilateral triangles, squares etc, are similar.

Reason (R): Two polygons of the same number of sides are said to be similar, if their corresponding angles are equal and lengths of corresponding sides are proportional.

Answer : (a) **Assertion (A):** Two polygons of the same number of sides are similar, if their corresponding angles are equal and corresponding sides are proportional. In equilateral triangles or squares, each angle is equal and sides are also proportional, therefore all regular polygons are similar.

Reason (R): It is also true.

Hence, both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Q 2. Assertion (A): In a \triangle ABC, if DE || BC and intersects

AB at D and AC at E, then $\frac{AB}{AD} = \frac{AC}{AE}$.

Reason (R): If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then these sides are divided in the same ratio.





Answer : (a) **Assertion (A):** In \triangle ABC, DE II BC, by using Thale's theorem, we have



So, Assertion (A) is true.

Reason (R): It is also true.

Hence, both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Q 3. Assertion (A): If the bisector of an angle of a triangle bisects the opposite side, then the triangle is isosceles.

Reason (R): The internal bisector of an angle of a triangle divides the opposite side internally in the ratio of the sides containing the angle.

Answer : (a) Assertion (A): In \triangle ABC, AD is the bisector of ZA.

 $\therefore \qquad \frac{AB}{AC} = \frac{BD}{DC}$ $\Rightarrow \qquad \frac{AB}{AC} = 1$ $(\because D \text{ is the mid-point of BC, } \therefore BD = DC)$ $\Rightarrow \qquad AB = AC$ Hence, $\triangle ABC$ is an isosceles.
So, Assertion (A) is true.

Reason (R): It is also true.

Hence, both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).





Q 4. Assertion (A): In a \triangle ABC, D and E are points on sides AB and AC respectively such that BD = CE. If <B = <C, then DE is not parallel to BC.

Reason (R): If a line divides any two sides of a triangle in the same ratio, then the line must be parallel to the third side.

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Answer : (d) Assertion (A): In \triangle ABC, we have \langle B = \langle C \rangle
                   AC = AB
 \Rightarrow
         (:: Sides opposite to equal angles are equal)
= AE + EC = AD + DB
= AE + CE = AD + DB
= AE+CE = AD+CE (BD = CE (Given)]
= AE = AD
Thus, we have
AD = AE
and BD = CE
                  \frac{AD}{BD} = \frac{AE}{CE} \implies \frac{AD}{DB} = \frac{AE}{FC}
 ...
= DE II BC
So, Assertion (A) is false.
Reason (R): It is true statement.
Hence, Assertion (A) is false but Reason (R) is true.
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Q 5. Assertion (A): In \triangle ABC, DE || BC, such that

AD = (7x-4) cm, AE = (5x-2) cm, DB = (3x+4) cm and EC = 3x cm then x is equal to 5.**Reason (R):** If a line is drawn parallel to one side of triangle to intersect the other two sides at a distinct point, then the other two sides are divided in the same ratio.





Answer: (d) Assertion (A): We have,



So, Assertion (A) is false.

Reason (R): It is true statement.

Hence, Assertion (A) is false but Reason (R) is true.

Q.6. Assertion (A) : If two sides of a right angle are 7 cm and 8 cm, then its third side will be 9 cm.

Reason (R) : In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

Answer: (d)





Q.7. Assertion (A) : If \triangle ABC and \triangle PQR are congruent triangles, then they are also similar triangles.

Reason (R) : All congruent triangles are similar but the similar triangles need not be congruent.

Answer: (a)

Q.8. Assertion (A) : In the given figures, $\triangle ABC \sim \triangle GHI$.

Reason (R) : If the corresponding sides of two triangles are proportional, then they are similar.

Answer: (a)

Q.9. Assertion (A) : The sides of two similar triangles are in the ratio 2 : 5, then the areas of these triangles are in the ratio 4 : 25.

Reason (R) : The ratio of the areas of two similar triangles is equal to the square of the ratio of their sides.

Answer: (a)

Q.10. Assertion (A) : In the given figure, PA || QB || RC || SD.

Reason (R) : If three or more line segments are perpendiculars to one line, then they are parallel to each other.



Answer: (a)

Q.11. Assertion (A) : In the \triangle ABC, AB = 24 cm, BC = 10 cm and AC = 26 cm, then \triangle ABC is a right angle triangle.

Reason (R) : If in two triangles, their corresponding angles are equal, then the triangles are similar.

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Answer: (b)

