

Quadrilaterals

Assertion & Reason Type Questions

Directions: In the following questions, a statement of Assertion (A) is followed by a statement of a Reason (R). 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.

Q1. Assertion (A): The opposite angles of a parallelogram are $(2x - 2)^\circ$ and $(52 - x)^\circ$. The measure of one of the angle is 34° .

Reason (R): Opposite angles of a parallelogram are equal.

Answer : (a) Assertion (A): Given opposite angles of a parallelogram are equal.

$$\therefore (2x - 2)^\circ = (52 - x)^\circ$$

$$\Rightarrow 2x + x = 52^\circ + 2^\circ \Rightarrow 3x = 54^\circ$$

$$\Rightarrow x = 18^\circ$$

Then the angles of a parallelogram are

$$(2x - 2)^\circ = (2 \times 18 - 2)^\circ = 34^\circ \text{ and } (52 - x)^\circ = (52 - 18)^\circ = 34^\circ$$

Hence, one of the angle of a parallelogram is 34°

So, Assertion (A) is true.

Reason (R): It is also true that opposite angles of a parallelogram are equal.

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

Q2. Assertion (A): In $\triangle ABC$, median AD is produced to E, such that $AD = DE$. Then, ABEC is a parallelogram.

Reason (R): Diagonals AE and BC bisect each other at right angles.

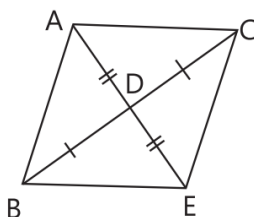


Answer :

(c) **Assertion (A):** Given in $\triangle ABC$, AD is median such that

$$AD = DE$$

Also, $BD = DC$.



It means in quadrilateral ABEC, diagonals AE and BC bisect each other at point D.

Therefore, ABEC is a parallelogram.

So, Assertion (A) is true.

Reason (R): In given figure diagonals are not right angled.

So, Reason (R) is false.

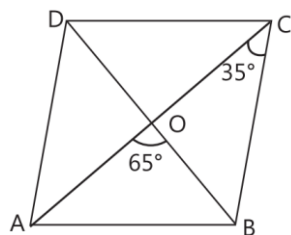
Hence, Assertion (A) is true but Reason (R) is false.

Q3.

Assertion (A): Diagonals AC and BD of a parallelogram ABCD intersect each other at point O. If $\angle BCA = 35^\circ$ and $\angle AOB = 65^\circ$, then $\angle DBC = 30^\circ$.

Reason (R): The adjacent angles of a parallelogram is supplementary.

Answer : (b) Assertion (A): Given, ABCD is a parallelogram.



$$\Rightarrow \angle BCA = 35^\circ$$

$$\text{or } \angle BCO = 35^\circ$$

$$\angle BOA + \angle BOC = 180^\circ \quad [\text{Linear pair}]$$

$$\Rightarrow \angle BOC = 180^\circ - 65^\circ = 115^\circ$$

In $\triangle BOC$, use angle sum property of a triangle.

$$\angle OBC + \angle BOC + \angle BCO = 180^\circ$$

$$\Rightarrow \angle DBC + 115^\circ + 35^\circ = 180^\circ \quad [\because \angle OBC = \angle DBC]$$

$$\Rightarrow \angle DBC = 30^\circ$$

So, Assertion (A) is true.

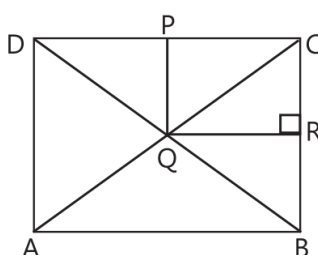
Reason (R): It is true to say that adjacent angles of a parallelogram is supplementary.

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

Q4. Assertion (A): ABCD and PQRC are rectangles and Q is a mid point of AC.
Then

DP = PC.

Reason (R): The line segment joining the mid-point of any two sides of a triangle is parallel to the third side and equal to half of it.



Answer : (b) Assertion (A): In right angled AADC, Q is the mid-point of AC such that $PQ \parallel AD$.

Therefore, P is the mid-point of DC.

[By converse of mid-point theorem]

DP = PC

Reason (R): It is also true to say that the line segment joining the mid-point of any two sides of a triangle is parallel to the third side and equal to half of it.

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