1. ABCD is a quadrilateral such that BC = BA and CD > AD. Which one of the following is correct?

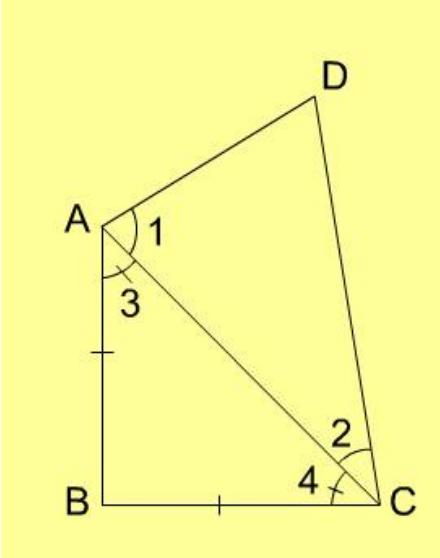
angle BAD = angle BCD

angle BAD < angle BCD

angle BAD > angle BCD

2angle BAD = angle BCD

Answer (c)



AB = BC
CD > AD
∠1 > ∠2 (angle opposite the larger side is greater than the angle opposite the smaller side)
Also, ∠3 = ∠4 [Angles opposite to equal sides of a triangle are equal]
∠1 + ∠3 > ∠2 + ∠4
∠BAD > ∠BCD

2. A quadrilateral ABCD is inscribed in a circle. If AB is parallel to CD but AD is not parallel to BC and AC = BD, then the quadrilateral must be a

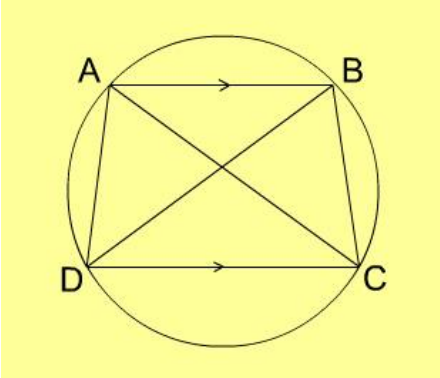
parallelogram

rhombus

trapezium

None of the above

Answer (c)



AB || CD but AD ∦ BC.
Therefore, neither a parallelogram nor a rhombus.
But since AB || CD the figure is a Trapezium.

3. If the diagonals of a quadrilateral are equal and bisect each other at right angles, then the quadrilateral is a

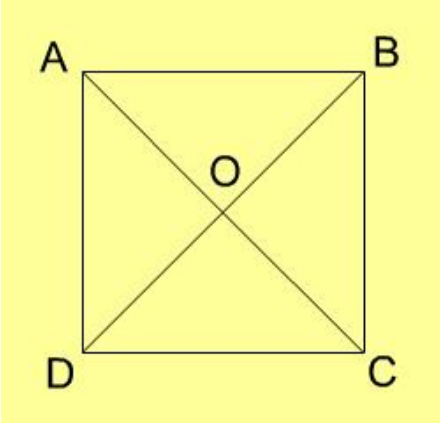
rectangle

square

rhombus

trapezium

Answer (b)



AC and BD bisect each other at O.
AC is perpendicular to BD at O.
AC = BD
—> ABCD is a square

4. If two parallel lines are cut by two distinct transversals, then the quadrilateral formed by the four lines is always a

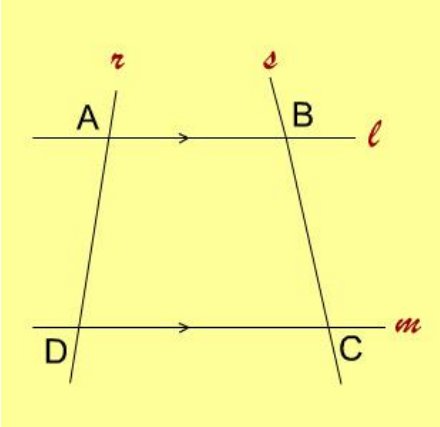
square

parallelogram

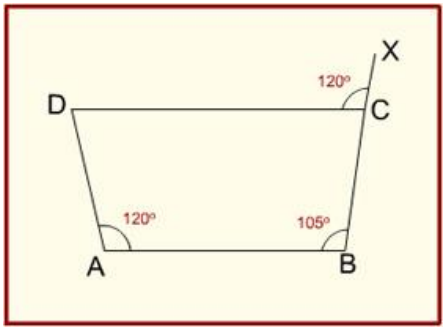
rhombus

trapezium

Answer (d)



In the figure $l \parallel m$; r and s are transversals.
Then ABCD is a trapezium, since in a trapezium only one pair of opposite sides is parallel.

5. 

In the quadrilateral ABCD shown above, ∠DAB = ∠DCX = 120°. If ∠ABC = 105°, what is ∠ADC equal to?

45°

60°

75°

95°

Answer (c)

∠DCX = 120°
Therefore ∠BCD = 180° – 120° = 60°
In quadrilateral ABCD.
120° + 105° + 60° + ∠D = 360°
—> ∠D = 75°

6. If A, B, C, D are the successive angles of cyclic quadrilateral, then what is cos A + cos B + cos C + cos D equal to?

4

2

1

0

Answer (d)

By the property of cyclic quadrilateral, sum of opposite angles = 180°
Thus, A + C = 180° and B + D = 180°
∴ A = (180° – C)
—> cosA = cos(180° – C) = – cosC
—> cosA + cosC = – cosC + cosC = 0
Similarly it can be shown that cosB + cosD = 0
Hence, cosA + cosB + cosC + cosD = 0

7. Consider the following statements:

The opposite angles of a cyclic quadrilateral are supplementary.

Angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle.

Which one of the following is correct in respect of the above statements?

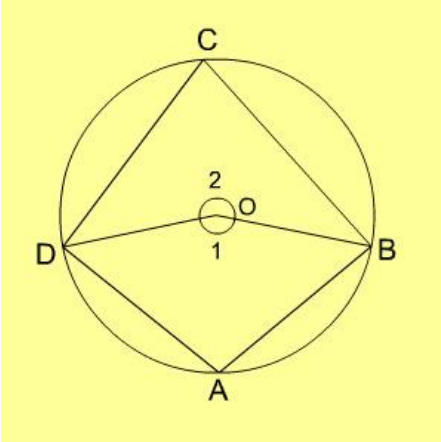
Statement-1 => statement-2

Statement-2 => statement-1

Statement-1 => statement-2

Neither statement-1 => statement-2 nor statement-2 = statement-1

Answer (b)



∠1 = 2 ∠C (degree measure theorem expressed in statement 2)
∠2 = 2 ∠A (same as above)
∠1 + ∠2 = 2 (∠A + ∠C)
360° = 2 (∠A + ∠C)
Therefore ∠A + ∠C = 180° .....(statement 1)
Hence statement 2 => statement 1

8. ABCD is a quadrilateral, the sides of which touch a circle. Which one of the following is correct?

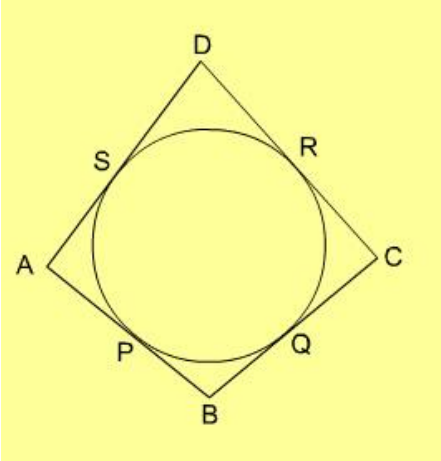
AB + AD = CB + CD

AB : CD = AD : BC

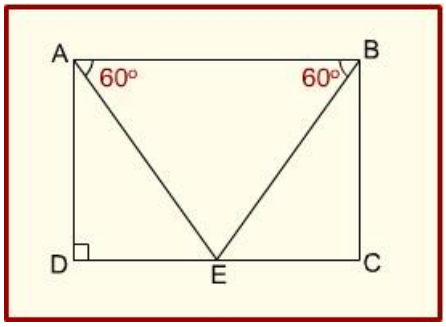
AB + CD = AD + BC

AB : AD = CB : CD

Answer (c)



Note: two tangents to a circle from a point outside the circle are equal, thus
AP = AS ... (i)
PB = BQ ... (ii)
DS = DR ... (iii)
RC = QC ... (iv)
Therefore (DR + RC) + (AP + PB) = DS + QC + AS + BQ
=> DC + AB = BC + AD.

9. 

In the figure given, ABCD is a quadrilateral with AB parallel to DC and AD parallel to BC. ADC is a right angle. If the perimeter of the triangle ABE is 6 units, what is the area of the quadrilateral?

$2\sqrt{3}$ square units

4 square units

3 square units

$4\sqrt{3}$ square units

Answer (a)

Triangle ABE is an equilateral triangle with perimeter 6 units; so the side is 2 units.
Area of triangle ABE = $\sqrt{3}(2)^2/4$ sq. units = $\sqrt{3}$ sq. units
Area of triangle ADE = (AD x ED)/2 and area of triangle BCE = (EC x BC)/2
Area of both the triangles = [(AD x ED) + (EC x BC)]/2 = [AD x CD]/2 (since AD = BC and ED + EC = CD)
[AD x CD]/2 = [AD x AB]/2 (since AB = CD) which is the area of triangle ABE
Therefore Area of the quadrilateral ABCD = Area of triangle ABE + Area of triangle ADE + area of triangle BCE = $2\sqrt{3}$ sq. units.

10. Consider the following statements in respect of a quadrilateral :

The line segments joining the midpoints of the two pairs of opposite sides bisect each other at the point of intersection.

The area of the quadrilateral formed by joining the midpoints of the four adjacent sides is half of the total area of the quadrilateral.

Which of the statements given above is/are correct?

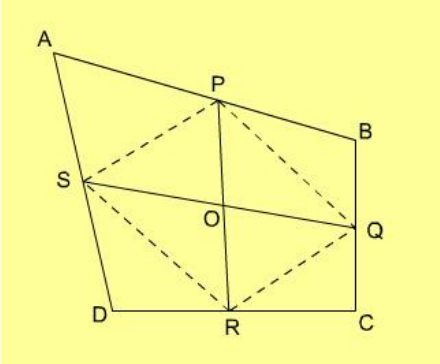
1 only

2 only

Both 1 and 2

Neither 1 nor 2

Answer (c)



Both the statements are true as per Varignon's theorem which states that the figure formed by joining the midpoints of adjacent sides of a convex quadrilateral is always a parallelogram. (Diagonals of a parallelogram bisect each other.) This parallelogram, known as the Varignon parallelogram, has an area equal to half the area of the original quadrilateral, and a perimeter equal to the sum of the lengths of the original quadrilateral's diagonals.