11. ABC is a triangle in which AB = AC. Let BC be produced to D. From a point E on the line AC let EF be a straight line such that EF is parallel to AB. Consider the quadrilateral ECDF thus formed. If angle ABC = 65° and angle EFD = 80°, then what is angle FDC equal to?

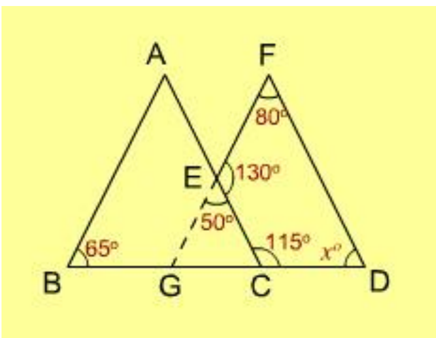
42°

41°

37°

35°

Answer (d)



∠ABC = ∠ACB = 65° (since AB = AC)
Therefore, ∠ACD = 180° – 65° = 115°
∠A = 180° – (65° + 65°) = 180° – 130° = 50°
Therefore ∠A = ∠GEC = 50° (since FG is parallel to AB)
Therefore, ∠FEC = 180° – 50° = 130°
In quadrilateral ECDF, sum of the angles is 360°
Therefore x = 360° – (80° + 130° + 115°) = 35°.

12. The quadrilateral formed by joining the mid-points of the sides AB, BC, CD, DA of a quadrilateral ABCD is

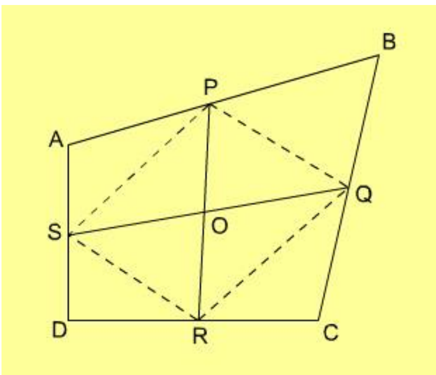
a trapezium but not a parallelogram

a quadrilateral but not a trapezium

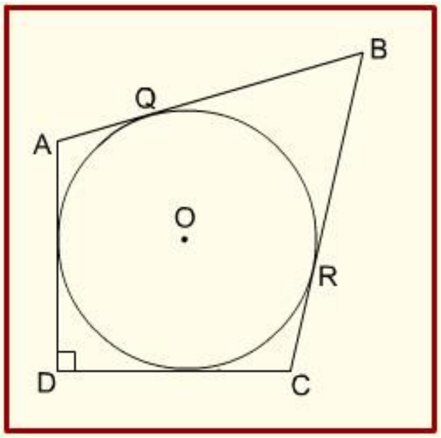
a parallelogram only

a rhombus

Answer (c)



A quadrilateral formed by joining the mid-points of the sides is a parallelogram only. (See the adjoining diagram.)

13. 

In the figure given above, a circle is inscribed in a quadrilateral ABCD. Given that BC = 38 cm, QB = 27 cm, DC = 25 cm and AD is perpendicular to DC. What is the radius of the circle?

11 cm

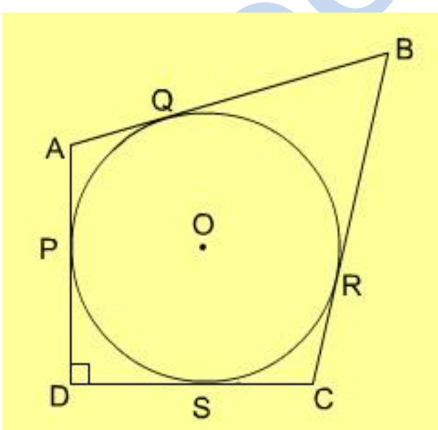
14 cm

15 cm

16 cm

Answer (b)

We know that two tangents to a circle from a point outside the circle are equal
Hence, QB = BR = 27 cm, thus RC = 38 - 27 = 11 cm
Also RC = SC = 11 cm, thus DS = DP = 25 - 11 = 14 cm
$\angle OPD = \angle OSD = 90°$ (angle formed by a tangent with the radius of a circle)
Thus POSD is a square with sides equal to 14 cm.



14. ABCD is a concyclic quadrilateral. The tangents at A and C intersect each other at P. If angle ABC = 100°, then what is angle APC equal to?

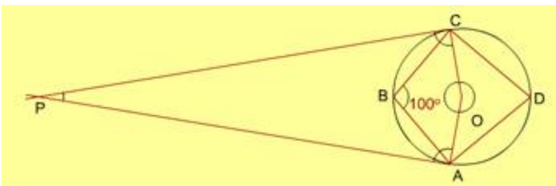
10°

20°

30°

40°

Answer (b)



∠AOC = 2∠ABC = 2 x 100 = 200° (external)
∠AOC (internal side) = 360° - 200° = 160°
∠OAP = ∠OCP = 90° (angle of the tangent with the radius)
Therefore, in the quadrilateral AOCP, ∠APC = 360° – (160° + 90° + 90°) = 20°

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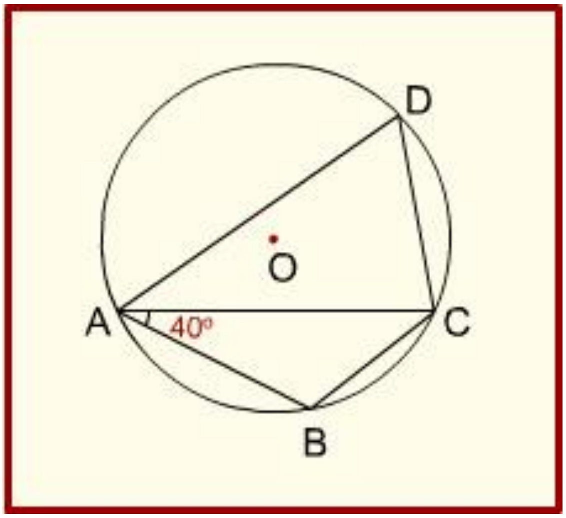
15. 

In the figure given above, O is the centre of a circle circumscribing a quadrilateral ABCD. If AB = BC and angle BAC = 40°, then what is angle ADC equal to?

50°

60°

70°

80°

Answer (d)

AB = BC => ∠BAC = ∠BCA = 40°
Therefore ∠ABC = 100°
Now ∠ADC + ∠ABC = 180° (sum of opposite angles of a quadrilateral is equal to 180°)
Therefore ∠ADC = 180° – 100° = 80°