ANSWER 30:

(a) 30°
∠ADC = ∠BAD = 30° (Alternate angles)
∠ADB = 90° (Angle in semicircle)
∴ ∠CDB = (90° + 30°) = 120°
But ABCD being a cyclic quadrilateral, we have:
∠BAC + ∠CDB = 180°
⇒ ∠BAD + ∠CAD + ∠CDB = 180°
⇒ 30° + ∠CAD + 120° = 180°
⇒ ∠CAD = (180° - 150°) = 30°

ANSWER 31:

(a) 50°
Take a point X on the remaining part of the circumference.
Join AX and CX.
Then ∠AXC= $\frac{1}{2}$∠AOC=($\frac{1}{2}$×100°)=50°
Now, side AB of the cyclic quadrilateral ABCX has been produced to D.
∴ Exterior ∠CBD = ∠AXC = 50°

ANSWER 32:

(c) 100°
OA = OB (Radii of a circle)
⇒ ∠OBA = ∠OAB = 50°
In Δ OAB, we have:
∠ OAB + ∠OBA + ∠AOB = 180° (Angle sum property of a triangle)
⇒ 50° + 50° + ∠AOB = 180°
⇒ ∠AOB = (180° - 100°) = 80°
Since ∠AOB + ∠BOD = 180° (Linear pair)
∴ ∠BOD = (180° - 80°) = 100°

ANSWER 33:

(b) 70°
BC = CD (given)
⇒ ∠BDC = ∠CBD = 35°
In Δ BCD, we have:
∠BCD + BDC + ∠CBD = 180° (Angle sum property of a triangle)
⇒ ∠BCD + 35° + 35° = 180°
⇒ ∠BCD = (180° - 70°) = 110°

In cyclic quadrilateral ABCD, we have:
$\angle BAD + \angle BCD = 180°$
$\Rightarrow \angle BAD + 110° = 180°$
$\therefore \angle BAD = (180° - 110°) = 70°$

ANSWER 34:

(c) 120°
Since ΔABC is an equilateral triangle, each of its angle is 60°.
$\therefore \angle BAC = 60°$
In a cyclic quadrilateral ABCD, we have:
$\angle BAC + \angle BDC = 180°$
$\Rightarrow 60° + \angle BDC = 180°$
$\Rightarrow \angle BDC = (180° - 60°) = 120°$

ANSWER 35:

(b) 80°
In a cyclic quadrilateral ABCD, we have:
Interior opposite angle, $\angle ADC$ = exterior $\angle CBE = 100°$
$\therefore \angle CDF = (180° - \angle ADC) = (180° - 100°) = 80°$ (Linear pair)

ANSWER 36:

(c) 110°
Join AB.
Then chord AB subtends ∠AOB at the centre and ∠AXB at a point X of the remaining parts of a circle.
$\therefore \angle AOB = 2\angle AXB$
$\Rightarrow \angle AXB = \frac{1}{2}\angle AOB = (\frac{1}{2} \times 140°) = 70°$
In the cyclic quadrilateral, we have:
$\angle AXB + \angle ACB = 180°$
$\Rightarrow 70° + \angle ACB = 180°$
$\therefore \angle ACB = (180° - 70°) = 110°$

ANSWER 37:

(c) 115°
Join AB.
Then chord AB subtends ∠AOB at the centre and ∠AXB at a point X of the remaining parts of a circle.
∴∠AOB = 2∠AXB
⇒∠AXB= $\frac{1}{2}$∠AOB=($\frac{1}{2}$×130°)=65°

In cyclic quadrilateral, we have:
∠AXB + ∠ACB = 180°
⇒ 65° + ∠ACB = 180°
∴∠ACB = (180° - 65°) = 115°

ANSWER 38:

(d) 110°
Since ABCD is a cyclic quadrilateral, we have:
∠BAD + ∠BCD = 180°
⇒ ∠BAD + 110° = 180°
⇒∠BAD = (180° - 110°) = 70°
Similarly in ABEF, we have:
∠BAD + ∠BEF = 180°
⇒ 70° + ∠BEF = 180°
⇒ ∠BEF = (180° - 70°) = 110°

ANSWER 39:

(c) 105°
We have:
∠ABC + ∠ADC = 180°
⇒ ∠ABC + 95° = 180°
⇒∠ABC = (180° - 95°) = 85°
Now, CF || AB and CB is the trANSWERversal.
∴ ∠BCF = ∠ABC = 85° (Alternate interior angles)
⇒ ∠BCE = (85° + 20°) = 105°
⇒ ∠DCB = (180° - 105°) = 75°
Now, ∠BAD + ∠BCD = 180°
⇒ ∠BAD + 75° = 180°
⇒ ∠BAD = (180° - 75°) = 105°

ANSWER 40:

(c) 8.5 cm
Join AC.
Then AE : CE = DE : BE (Intersecting secant theorem)
∴ AE × BE = DE × CE
Let CD = y cm
Then AE = (AB + BE) = (11 + 3) cm = 14 cm; BE = 3cm; CE = (y + 3.5) cm; DE = 3.5 cm
∴ 14 × 3 = (y + 3.5) × 3.5
$\Rightarrow y+3.5=\frac{14\times3}{3.5}=\frac{42}{3.5}=12$
$\Rightarrow y$ = (12 - 3.5) cm = 8.5 cm
Hence, CD = 8.5 cm

ANSWER 41:

(b) 6 cm
We know that the line joining their centres is the perpendicular bisector of the common chord.
Join AP.
Then AP = 5 cm; AB = 4 cm
Also, $AP^2 = BP^2 + AB^2$
Or $BP^2 = AP^2 - AB^2$
Or $BP^2 = 5^2 - 4^2$
Or BP = 3 cm
∴ ΔABP is a right angled and PQ = 2 × BP = (2 × 3) cm = 6 cm

ANSWER 42:

(c) 60°
We have:
∠AOB = 2∠ACB
$\Rightarrow \angle ACB=\frac{1}{2}\angle AOB=(\frac{1}{2}\times 90°)=45°$
∠COA = 2∠CBA = (2 × 30°) = 60°
∴ ∠COD = 180° - ∠COA = (180° - 60°) = 120°
$\Rightarrow \angle CAO=\frac{1}{2}\angle COD=(\frac{1}{2}\times 120°)=60°$