

Exercise 3E

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Question 47:
\angle A + \angle B + \angle C = 180^{\circ}
x + 3x + y = 180
4x + y = 180 ---(1)
Also,
3y - 5x = 30
-5x + 3y = 30 ---(2)
Multiplying (1) by 3 and (2) by 1, we get
12x + 3y = 540 ---(3)
-5x + 3y = 30 ---(4)
Subtracting (4) from (3), we get
17x = 510
x = 30
Putting x = 30 in (1), we get
4 \times 30 + y = 180
y = 60
Hence \angle A = 30^{\circ}, \angle B = 3 \times 30^{\circ} = 90^{\circ}, \angle C = 60^{\circ}
Therefore, the triangle is right angled.
Question 48:
In a cyclic quadrilateral ABCD:
\angle A = (x + y + 10)^{\circ},
\angle B = (y + 20)^{\circ},
\angle C = (x + y - 30)^{\circ},
\angle D = (x + y)^{\circ}
We have, \angle A + \angle C = 180^{\circ} and \angle B + \angle D = 180^{\circ}
[ since ABCD is a Quadrilateral]
Now,
\angle A + \angle C = (x + y + 10)^{\circ} + (x + y - 30)^{\circ} = 180^{\circ}
2x + 2y - 20^{\circ} = 180^{\circ}
x + y - 10^{\circ} = 90^{\circ}
x + y = 100 ---(1)
Also,
\angle B + \angle D = (y + 20)^{\circ} + (x + y)^{\circ} = 180^{\circ}
x + 2y + 20^{\circ} = 180^{\circ}
x + 2y = 160^{\circ} ---(2)
Subtracting (1) from (2), we get
y = 160 - 100 = 60
Putting y = 60 in (1), we get
x = 100 - y
x = 100 - 60
x = 40
Therefore,
\angle A = (x + y + 10)^{\circ} = (60 + 40 + 10)^{\circ} = (100 + 10)^{\circ} = 110^{\circ}
\angle B = (y + 20)^{\circ} = (60 + 20)^{\circ} = 80^{\circ}
\angle C = (x + y - 30)^{\circ} = (60 + 40 - 30)^{\circ} = (100 - 30)^{\circ} = 70^{\circ}
\angle D = (x + y)^{\circ} = (60 + 40)^{\circ} = 100^{\circ}
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