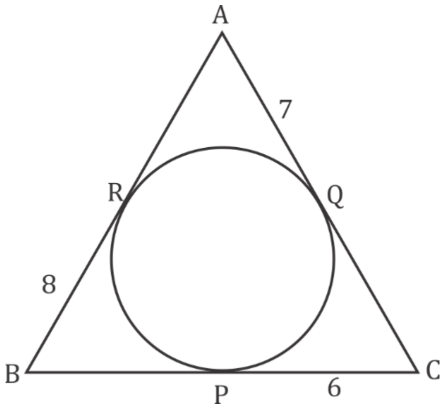
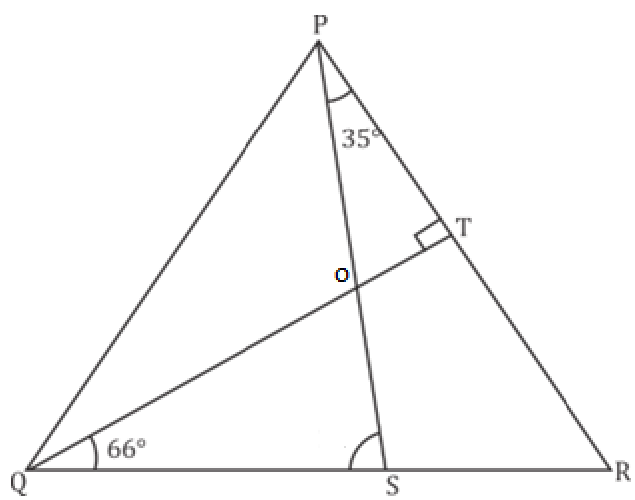
Solutions:

S1. Ans.(a)
Sol.



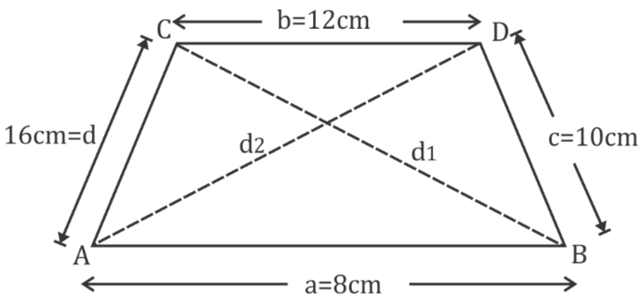
AQ = AR = 7cm (Tangents from the same external point to the circle)
BR = BP = 8cm (Tangents from the same external point to the circle)
and
PC and QC = 6cm (Tangents from the same external point to the circle)
The perimeter of triangle ABC
2(AQ + PC + BR) = 2(7 + 6 + 8) = 42cm

S2. Ans.(d)
Sol.



In ΔPOT
∠POT + ∠OTP + ∠TPO = 180
∠POT = 55°
∠POT and ∠SOQ = 55°
In ΔQOS
∠QOS + ∠OSQ + ∠SQO = 180
55° + x° + 66 = 180°
x = 59°

S3. Ans.(b)
Sol.



Formula :
$d_1^2 + d_2^2 = c^2 + d^2 + 2ab$ [Property]
$d_1^2 + d_2^2 = 10^2 + 16^2 + 2 \times 12 \times 8$
= 100 + 256 + 192
$d_1^2 + d_2^2 = 548$ cm²

S4. Ans.(d)
Sol. Assuming the sides be 3x and 4x.

$$\frac{\frac{(3x-2)}{3x}\times 180^\circ}{\frac{(4x-2)}{4x}\times 180^\circ} = \frac{8}{9}$$

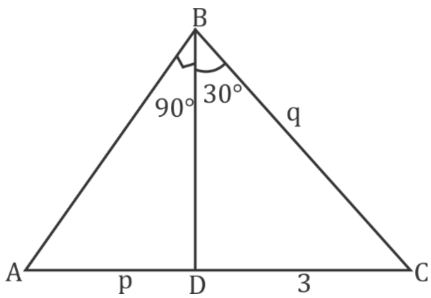
$$\frac{(3x-2)\times 4}{3(4x-2)} = \frac{8}{9}$$

$$\frac{(3x-2)}{4x-2} = \frac{2}{3}$$

$$\Longrightarrow \frac{3x-2}{4x-2} = \frac{2}{3}$$

$\Longrightarrow 9x - 6 = 8x - 4$
$\Longrightarrow x = 2$
Number of sides of polygon:
$3 \times 2 \rightarrow 6$
$4 \times 2 \rightarrow 8$

S5. Ans.(d)
Sol.

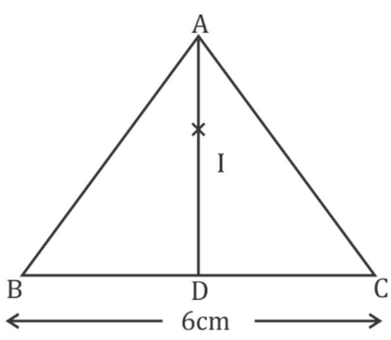


$$\frac{Ar.\ \Delta ABD}{Ar.\ \Delta BDC} = \frac{\frac{1}{2}\times AB\times BD\times \sin 90°}{\frac{1}{2}\times q\times BD\times \sin 30°} = \frac{p}{3}$$

$$\frac{2\times 2}{q} = \frac{P}{3}$$

12 = pq

S6. Ans.(c)
Sol.

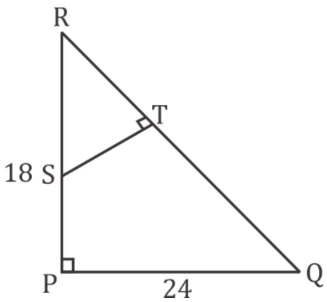


$$\frac{AI}{ID} = \frac{AB+AC}{BC}$$

$$\Longrightarrow \frac{(16-6)}{6}$$

$$\Longrightarrow \frac{5}{3}$$

S7. Ans.(c)
Sol.



Area ΔPQR = $\frac{1}{2}$ × base × height

= $\frac{1}{2}$ × 24 × 18 = 216 cm^2

Δ PQR ~ ΔSTR

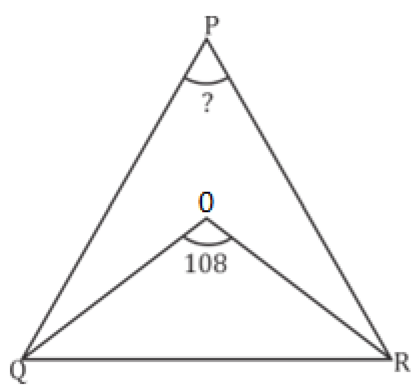
Corresponding side ratio

$$\frac{Area\ \ of\ \Delta TRS}{Area\ of\ \Delta PQR} = \left(\frac{9}{30}\right)^2 = \left(\frac{3}{10}\right)^2 = \frac{9}{100}$$

100 units → 216 cm^2

9 units → 19.44 cm^2

S8. Ans.(d)
Sol.



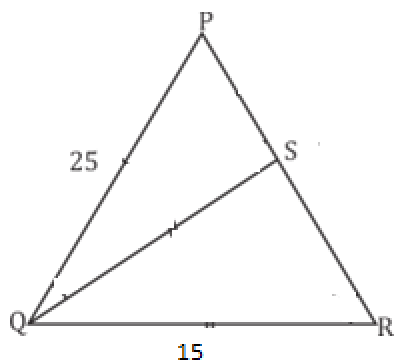
∠QOR = 90 + $\frac{\angle P}{2}$

108 = 90 + $\frac{\angle p}{2}$

∠P = 36°

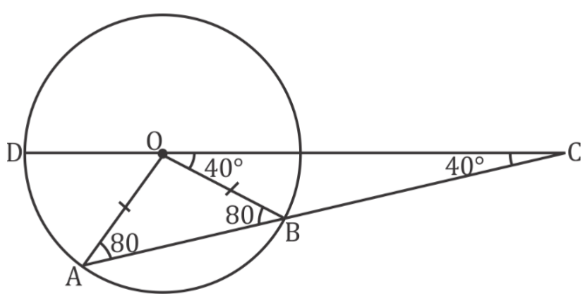
[Type here]

S9. Ans.(c)
Sol.



$\frac{PS}{SR} = \frac{25}{15} = \frac{5}{3}$ { using Angle Bisector Theorem}

S10. Ans.(d)
Sol.



AO = BC (Given)

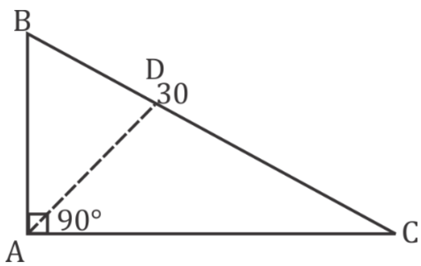
OA = OB (Radius circle)

∠AOD is exterior angle of ΔAOC

∠AOC = 80 + 40 = 120°

S11. Ans.(b)
Sol.

[Type here]



Median AD = $\frac{BC}{2} = \frac{30}{2}$ = 15 cm

S12. Ans.(b)

Sol. θ = $\frac{110° + 50°}{2}$

θ = 80°

S13. Ans.(c)

Sol. Let the side of the triangle be x, x and y.

Case 1: (x + x = 2x =14) When both the sides are equal whose Sum is given

|x - x|< Side < |x + x|

0 < a < 14

⟹ 13 triangles possible here.

Case 2: (x + y = 14) When both the sides are different

|x - x|< y < |x + x|

|x - x|< y < |2x|

|x - x|< y < |2 (14 - y)|

0 < y < |28-2y|

0 < 3y < |28|

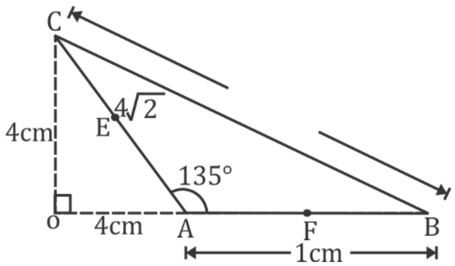
0 < y < 9.33

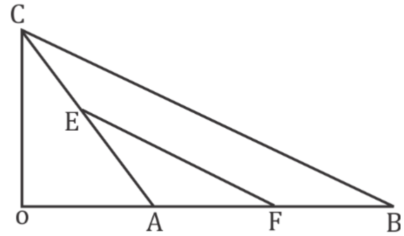
Y can take value from 1 to 9 except 7, so, here y can take 8 value

13 + 8 = 21 triangles

S14. Ans.(a)

Sol.





OB = 5cm

OC = 4cm

Using Pythagoras :

BC = $\sqrt{(5)^2 + (4)^2}$

BC = $\sqrt{41}$ cm

$$\boxed{EF = \frac{\sqrt{41}}{2} cm}$$

S15. Ans.(d)

Sol. Using cosine formula

cos 60° = $\frac{(3)^2+(1+\sqrt{3})^2-x^2}{2\times3\times(1+\sqrt{3})}$

$\frac{1}{2} = \frac{9+4+2\sqrt{3}-x^2}{2\times3(1+\sqrt{3})}$

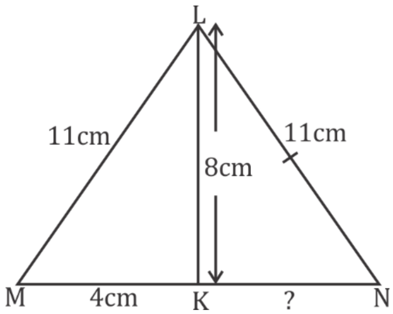
$3 + 3\sqrt{3} = 13 + 2\sqrt{3} - x^2$

$x^2 = 10 - \sqrt{3}$

x = $\sqrt{10 - \sqrt{3}}$ cm

S16. Ans.(a)

Sol. Using Stewart theorem (Simplified Form)



$\Longrightarrow (LM) \times (LN) - (S)^2 = (MK)(KN)$ [∴ Let S be Cevian]

$\Longrightarrow (11)^2 - (8)^2 = (4)(KN)$

$\frac{57}{4} = KN$

14.25 cm = KN

S17. Ans.(b)
Sol. From options
Apply Pythagoras theorem

$(x^2 + 1)^2 = (x^2 - 1)^2 + (2x)^2$

$\Longrightarrow (x^2 + 1)^2 - (x^2 - 1) = (2x)^2$

$\Longrightarrow x^4 + 1 + 2x^2 - x^4 - 1 + 2x^2 = 4x^2$

$\Longrightarrow 4x^2 = 4x^2$

Hence, it is a right-angle triangle.

S18. Ans.(d)
Sol. r = 12 cm

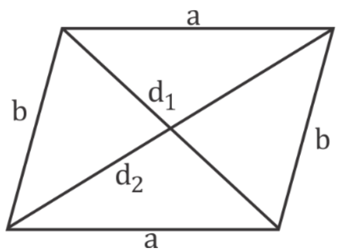
$S = \frac{100}{2} = 50$ cm

$\Delta = rs$

$= 50 \times 12$

$= 600$ cm^2

S19. Ans.(a)
Sol.



$2(a^2 + b^2) = d_1^2 + d_2^2$

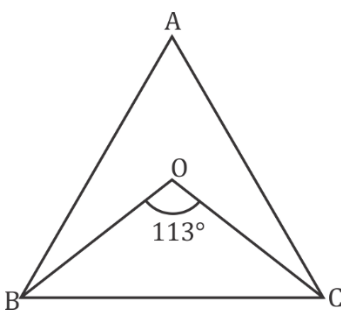
A.T.Q

$2(8^2 + 5^2) = 10^2 + d_2^2$

$\sqrt{78} = d_2$

S20. Ans.(c)

Sol.



$\angle BOC = 90 + \frac{\angle A}{2}$

$113 = 90 + \frac{\angle A}{2}$

$\angle A = 46°$