Triangle Questions for SSC Exam.

Triangle Quiz 6

Directions: Kindly study the following Questions carefully and choose the right answer:

1. In a Δ ABC, if D and E are the points on the sides AB and AC respectively such that DE || BC and if AD = x , DB = x – 2 , AE = x + 2 and EC = x – 1. then find the value of x .

A. 5 B. 4 C. 3 D. 2

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2. In a equilateral triangle ABC, if AD ⊥ BC, then :

A. $2\ AB^2 = 3\ AD^2$ B. $4\ AB^2 = 3\ AD^2$ C. $3\ AB^2 = 4\ AD^2$ D. $3\ AB^2 = 2\ AD^2$

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3. Longest side of a triangle is 20 cm and another side is 10 cm. If area of the triangle is 80 cm2, then what is the length (in cm) of its third side?

A. $\sqrt{260}$ B. $\sqrt{250}$ C. $\sqrt{256}$ D. $\sqrt{240}$

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4. In a Δ ABC, the sides AB and AC have been produced to D and E. Bisectors of ∠ CBD and ∠ BCE meet at O. If ∠ A = 64°, then ∠ BOC is :

A. 52° B. 58° C. 26° D. 112°

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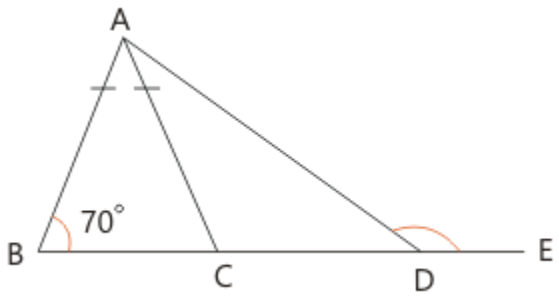
5. In ΔABC, AB = AC, ∠B = 70°, ∠BAD = 80°, ∠ADE = ?



A. 150° B. 135° C. 140° D. 120°

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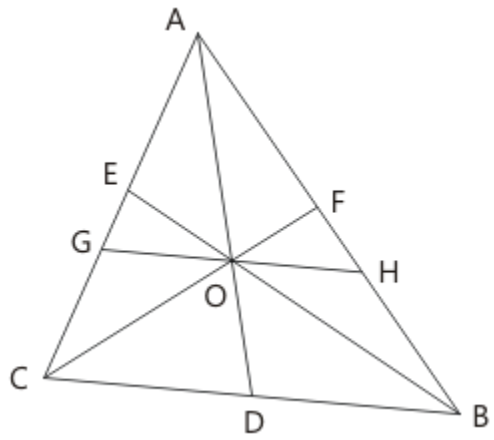
6. Find the sum of the medians of isosceles triangle, whose sides are 10, 10 and 12.

A. $8 + 2\sqrt{97}$ cm B. $10 + 2\sqrt{97}$ cm C. $10 + 2\sqrt{67}$ cm D. None of these

7. In the figure shown below AD, BE and CF are all medians of triangle ABC, and GH is parallel to BC. If BH = 10 cm, what is the length (in cm) of AB?



A. 10 B. 20 C. 25 D. 30

8. If the geometric mean of the lengths of three sides of a triangle is 3 and the area of the circumcircle is 9π, what is the area of the triangle (in sq. units)?

A. 9 B. $\frac{9}{4}$ C. $\frac{5}{4}$ D. 36

9. I is the incentre of triangle PQR. If ∠PRQ = 80°, ∠QIR = 110° and QI = 21 cm, then what will be the area of the incircle?

A. 376.5 cm^2 B. 346.5 cm^2 C. 364 cm^2 D. 396 cm^2

10. In ΔABC, a line is drawn from A to intersect the opposite side BC at D. What is m ∠BAD such that AC = CD and m ∠CAB = m ∠ABC + 60°?

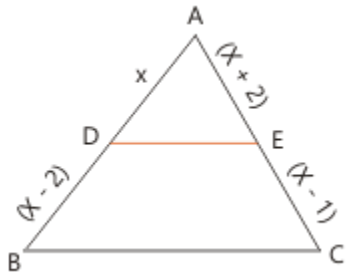
A. 15° B. 30° C. 20° D. 25°

Correct Answers:

1	2	3	4	5	6	7	8	9	10
B	C	A	B	A	A	D	B	B	B

Explanations:

1. Since, DE || BC

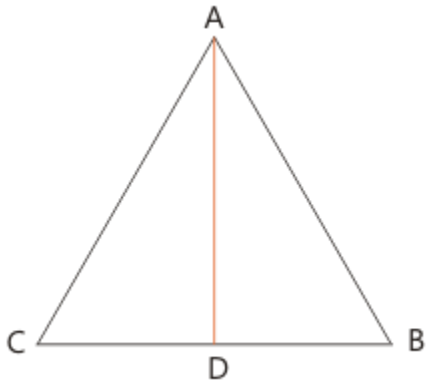


$\therefore \frac{AD}{DB} = \frac{AE}{EC}$

$\Rightarrow \frac{x}{x-2} = \frac{x+2}{x-1}$

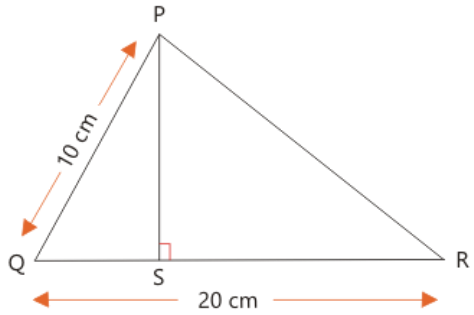
$\Rightarrow x(x-1) = (x+2)(x-2)$
$\Rightarrow x^2 - x = x^2 - 4$
$\Rightarrow x = 4$
Hence, option B is correct.

2.



$AB^2 = BD^2 + AD^2 \Rightarrow AB^2 = (\frac{1}{2}AB)^2 + AD^2$
$\therefore \ 4AB^2 = AB^2 + 4AD^2 \Rightarrow 3AB^2 = 4AD^2$
Hence, option C is correct.

3.



Let PS be altitude of ΔPQR.

Area of ΔPQR = 80 = $\frac{1}{2}$ × QR × PS

$\Rightarrow 80 = \frac{1}{2} \times 20 \times PS \Rightarrow PS = 8$ cm

As we know, PQ = 10 cm and PS = 8 cm

Now, by the Pythagorean theorem, we get

∴ In ΔPSQ, QS = 6 cm

∴ SR = QR – PS = (20 – 6) = 14 cm

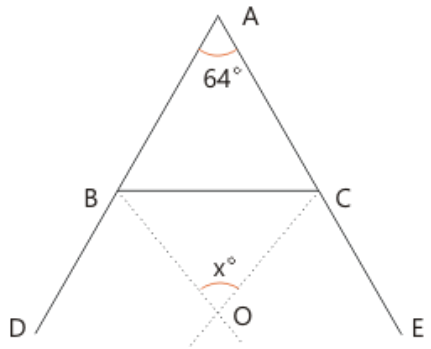
In ΔPSR,

$PR^2 = PS^2 + SR^2 = 8^2 + 14^2 = 260$.

∴ PR = 260 cm

Hence, option A is correct.

4.



∠CBD = ∠A + ∠C , ∠BCE = ∠B + ∠A.

[∵ An exterior angle of a triangle is equal to the sum of the opposite interior angles.]

∴ ∠CBD + ∠BCE = (∠A + ∠B + ∠C) + ∠A = 180° + A

$\frac{1}{2}\angle CBD + \frac{1}{2}\angle BCE = 90° + \frac{A}{2}$

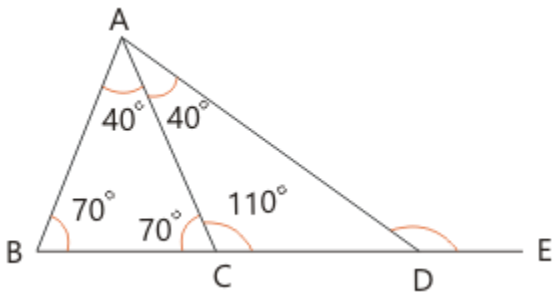
But, $\frac{1}{2}\angle CBD + \frac{1}{2}\angle BCE + \angle BOC = 180°$

∴ $\angle BOC = 180° - (90° + \frac{A}{2})$

$= (90° - \frac{A}{2}) = (90° - \frac{64}{2}) = 58°$.

Hence, option B is correct.

5.



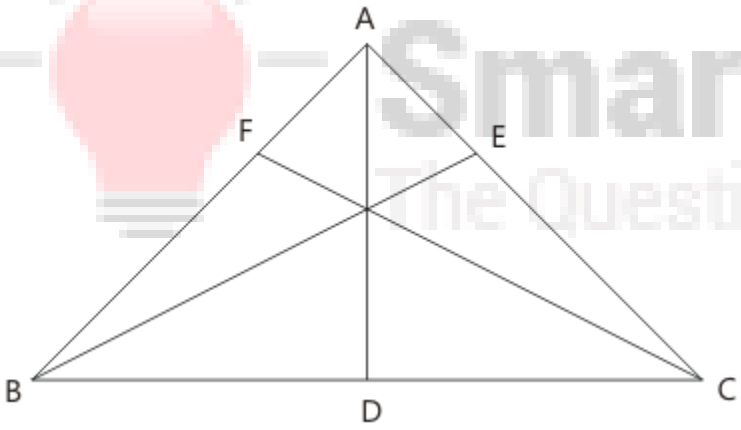
$\angle B = \angle ACB = 70°$

$\angle BAC = 180° - (70° + 70°) = 40°$

$\angle ADE = \angle CAD + \angle ACD = 40° + 110° = 150°$

Hence, option A is correct.

6. In ΔABC, a = BC = 12 cm, b = AC = 10 cm and c = AB = 10 cm



Let AD, BE and CF are the medians of ΔABC.

In geometry, Apollonius' theorem is a theorem relating the length of a median of a triangle to the lengths of its side. It states that "the sum of the squares of any two sides of any triangle equals twice the square on half the third side, together with twice the square on the median bisecting the third side".

$\therefore$ $AB^2 + AC^2 = 2(AD^2 + BD^2)$

$\therefore$ $(10)^2 + (10)^2 = 2(AD^2 + 6^2)$

$\therefore$ $200 + 2(AD^2 + 36)$

$\therefore$ AD = 8 cm

Using $AB^2 + BC^2 = 2(BE^2 + AE^2)$, we get

BE = 97 cm

Similarly, using $AC^2 + BC^2 = 2(CF^2 + AF^2)$, we get

CF = 97 cm

Thus, AD + BE + CF = (8 + 297) cm

Hence, option A is correct.

7. We use the property that medians of a triangle divide each other in the ratio 2 : 1.

$\therefore$ AO : OD = BO : OE = CO : OF = 2 : 1

Now, consider ΔAOH and ΔADB. We can see that they are similar by the AAA property.

$\therefore$ Their sides are in the same ratio.

Specifically, AO : AD = 2 : 3 = AH : AB

$\therefore$ $AH = \frac{2}{3} \times AB = \frac{2}{3} \times (AH + BH) = \frac{2}{3} \times (AH + 10)$

$\therefore$ AH = 20 cm

$\therefore$ AB = AH + BH = 30 cm

Hence, option D is correct.

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8. Let the sides of the triangle be a, b, c and circumradius be R.

Geometric mean of a, b and c = $(abc)^{1/3} = 3$

$\therefore$ $abc = 3^3 = 27$

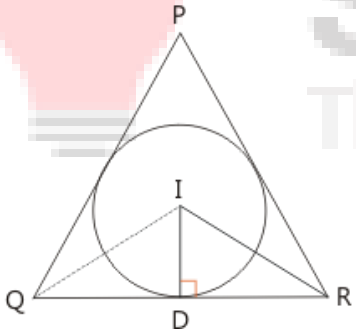
Area of circumcircle = $\pi R^2 = 9\pi$

$\therefore$ Circumradius = R = 3

Now, area of triangle = $\frac{abc}{4R} = \frac{9}{4}$

Hence, option B is correct.

9.



Given that, I is the incentre of the triangle PQR and $\angle PRQ = 80°$

Now, $\angle QIR = 110°$ and QI = 21 cm

Let ID $\perp$ QR

$\angle QPR = 2(110 - 90) = 40°$

(By the property of incircle)

$\therefore$ $\angle PQR = 180 - \angle QPR - \angle PRQ$

$= 180 - 40 - 80 = 60°$

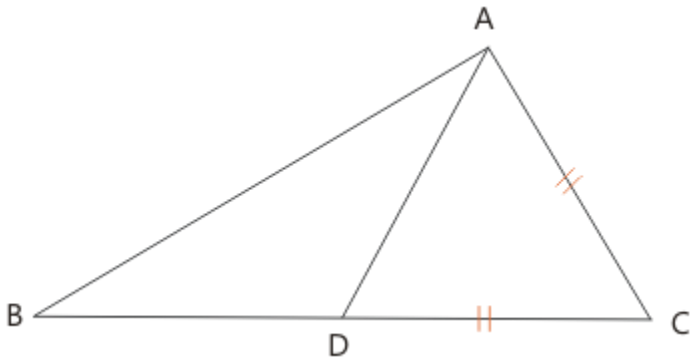
$\angle IQD = \frac{\angle PQR}{2} = \frac{60}{2} = 30°$

Now, $ID = IQ = \sin 30° = 21 \times \frac{1}{2} = \frac{21}{2}$ cm

$\therefore$ Area of incircle = $\frac{22}{7} \times \frac{21}{2} \times \frac{21}{2} = 346.5 \text{ cm}^2$

Hence, option B is correct.

10.



∵ AC = CD, m ∠ADC = m ∠ACD

m ∠BAD = m ∠CAB – m ∠CAD

= m ∠CAB – m ∠ADC

Using exterior angle theorem, m ∠ADC = m ∠BAD + m ∠ABD

∴ m ∠BAD = m ∠CAB – (m ∠BAD + m ∠ABD)

m ∠ABD = m ∠ABC

∴ 2(m ∠BAD) = m ∠CAB – m ∠ABC = 60°

∴ m ∠BAD = 30°

Hence, option B is correct.