Triangle Questions for SSC Exams (CGL Tier 1, CGL Tier 2 & SSC 10+2)

Triangle Quiz 1

Directions: Study the following questions carefully and choose the right answer:

1. Consider the following statements

I. If G is the centroid of ΔABC, then GA = GB = GC.

II. If H is the orthocentre of ΔABC, then HA = HB = HC.

Which of the statements given above is/are correct?

A. Only I B. Only II C. Both I and II D. Neither I nor II

2. AB is a straight line, C and D are points the same side of AB such that AC is perpendicular to AB and DB is perpendicular to AB. Let AD and BC meet at E. What is $\frac{AE}{AD} + \frac{BE}{BC}$ equal to?

A. 2 B. 1.5 C. 1 D. None of these

3. The three sides of a triangle are 15, 25 and x units. Which one of the following is correct?

A. $10 < x < 40$ B. $10 \leq x \leq 40$ C. $10 \leq x < 40$ D. $10 < x \leq 40$

4. Which one of the following is a Pythagorean triple in which one side differs from the hypotenuse by two units? Where, n is a positive real number.

A. $(2n + 1, 4n, 2n^2 + 2n)$ B. $(2n, 4n, n^2 + 1)$ C. $(2n^2, 2n, 2n + 1)$

D. $(2n, n^2 – 1, n^2 + 1)$

5. The sides of a right angled triangle are equal to three consecutive numbers expressed in centimeters. What can be the area of such a triangle?

A. 6 cm^2 B. 8 cm^2 C. 10 cm^2 D. 12 cm^2

6. If AD is the internal angular bisector of angle A of ΔABC with AB = 3 cm and AC = 1 cm, then what is BD : BC equal to?

A. 1 : 3 B. 1 : 4 C. 2 : 3 D. 3 : 4

7. The sides of a triangle are in geometric progression with common ratio r < 1. If the triangle is a right angled triangle, the square of common ratio is given by

A. $\frac{\sqrt{5}+1}{2}$ B. $\frac{\sqrt{5}-1}{2}$ C. $\frac{\sqrt{3}+1}{2}$ D. $\frac{\sqrt{3}-1}{2}$

8. If triangles ABC and DEF are similar such that 2AB = DE and BC = 8 cm, then what is EF equal to?

A. 16 cm B. 12 cm C. 10 cm D. 8 cm

9. In a ΔABC, AD is perpendicular to BC and BE is perpendicular to AC. Which of the following is correct?

A. CE × CB = CA × CD B. CE × CA = CD × CB C. AD × BD = AE × BE D. AB × AC = AD × BE

10. Let ABC is triangle right angled at B. If AB = 6 cm and BC = 8 cm, then what is the length of the circumradius of the ΔABC?

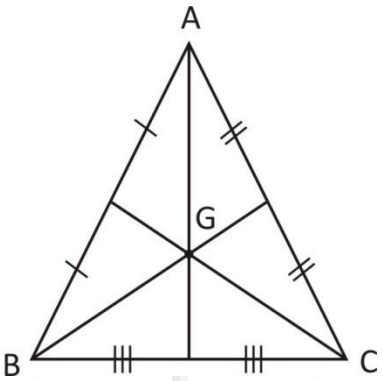
A. 10 cm B. 7 cm C. 6 cm D. 5 cm

Correct Answers:

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

Explanations:

1.



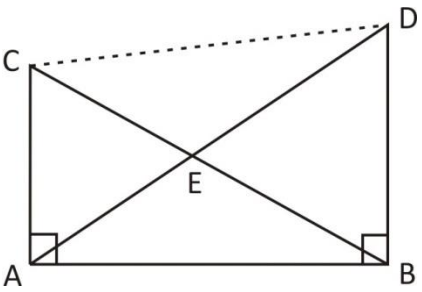
GA = GB = GC is true only and only for equilateral triangle and here it is not given that ABC is an equilateral triangle. So, only for equilateral triangle.

Hence, it is also not correct.

Hence, option D is correct.

2.

Since, AB is a straight line and C and D are points such that AC ⊥ AB and BD ⊥ AB.



∴ AC || BD

So, ABCD forms trapezium.

Now, by property of trapezium diagonals intersect each other in the ratio of lengths of parallel sides.

$\therefore \frac{AE}{ED} = \frac{BE}{CE} \Rightarrow \frac{AE}{AD - AE} = \frac{BE}{BC - BE}$

$\Rightarrow \frac{BC - BE}{BE} = \frac{AE - AE}{BC - BE} \Rightarrow \frac{BC}{BE} - 1 = \frac{AD}{AE} - 1$

$\Rightarrow \frac{BC}{BE} = \frac{AD}{AE}$

$\Rightarrow \frac{AE}{AD} = \frac{BE}{BC}$

But the value of $\frac{AE}{AD}$ or $\frac{BE}{BD}$ Can't be determined.

So, we can't find the value of $\frac{AE}{AD} + \frac{BE}{BD}$.

Hence, option D is correct.

3.

In a triangle

Sum to two sides is always greater than 3rd side

i.e., $x < 40$ ..... (i)

Difference of two sides is always less than 3rd side

i.e., $10 < x$ ..... (7ii)

From Eqs. (i) and (ii),

$10 < x < 40$.

Hence, option A is correct.

4.

By hit and trial method,

Put n = 2 in option (d)

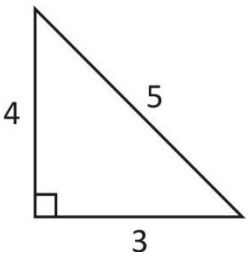
$= [(2 \times 2), (2)^2 - 1, (2)^2 + 1] = (4, 3, 5)$

Which satisfy Pythagoras theorem and one side differes from hypotenuse by 2 units.

Hence, option D is correct.

5.

Since, the triangle is right angled. So, all the three consecutive sides must satisfy Pythagoras theorem.



Hence, 3, 4 and 5 are the sides of triangle which satisfy pythagoras theoram.

$\therefore$ Area of triangle $= \frac{1}{2} \times 4 \times 3 = 6\ cm^2$

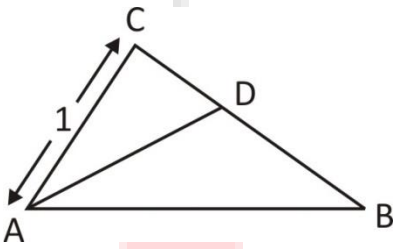
Hence, option A is correct.

6.

In ΔABC,

AD is the internal angle bisector of $\angle A$.

Using property of internal angle bisector.



$\frac{BD}{CD} = \frac{AB}{AC} \Rightarrow \frac{CD}{BD} = \frac{AC}{AB}$

$\Rightarrow \frac{CD}{BD} + 1 = \frac{AC}{AB} + 1 \quad \Rightarrow \quad \frac{CD + BD}{BD} = \frac{AC + AB}{AB}$

$\Rightarrow \frac{BC}{BD} = \frac{3 + 1}{3} \quad \Rightarrow \quad \frac{BD}{BC} = \frac{3}{4}$

$\therefore$ BD : BC = 3 : 4.

Hence, option D is correct.

7.

let the sides of triangle be $\frac{a}{r}$, a, ar and since r < 1.

$\therefore \frac{a}{r} > a > ar$

Now, triangle is right angled.

Using Pythagoras theorem.

$\left(\frac{a}{r}\right)^2 = (a)^2 + (ar)^2 \quad \Rightarrow \quad \frac{a^2}{r^2} = a^2 + a^2r^2$

$\Rightarrow \frac{a^2}{r^2} = a^2(1 + r^2) \Rightarrow r^2 + r^4 = 1.$

Put $r^2 = x$

$\therefore \quad x^2 + x - 1 = 0$

Applying Sridharacharya rule, we get

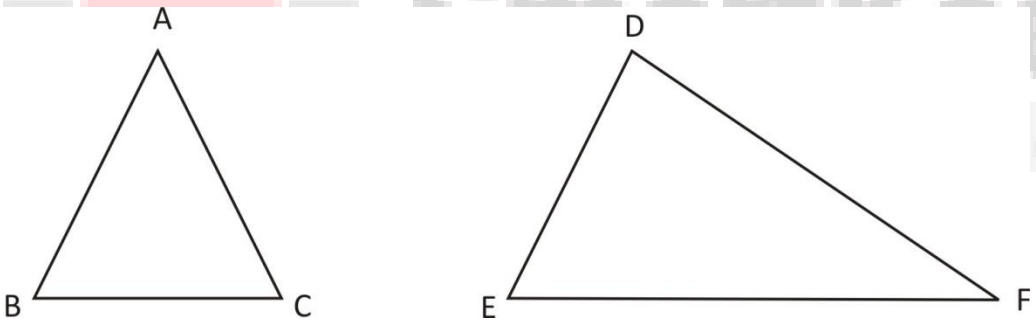
$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{-1 \pm \sqrt{1 - 4(-1)}}{2} = \frac{-1 \pm \sqrt{5}}{2}$

$r^2 = \frac{\sqrt{5} - 1}{1}$

Hence, option B is correct.

8.



$\because \quad \Delta ABC - \Delta DEF$

$\therefore \quad \frac{AB}{DE} = \frac{BC}{EF} \quad \Rightarrow \quad \frac{1}{2} = \frac{8}{EF}$

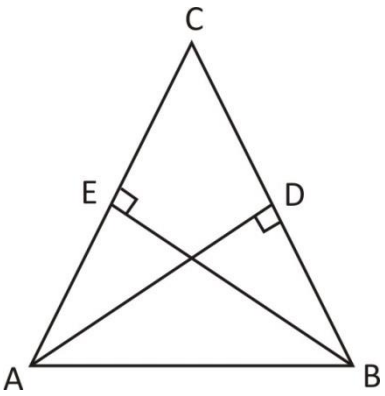
EF = 16 cm.

Hence, option A is correct.

9.

Area of $\Delta ABD = \frac{1}{2} \times BD \times AD$ ....(i)

and Area of $\Delta ABE = \frac{1}{2} \times AE \times BE$ ....(ii)

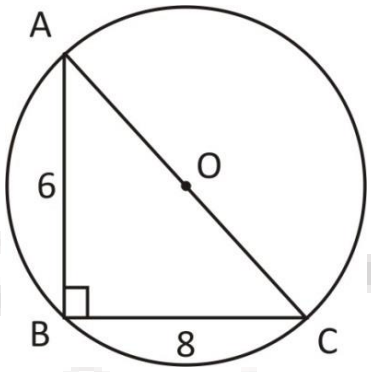


From Eqs. (i) and (ii),

$\frac{1}{2} \times BD \times AD = \frac{1}{2} \times AE \times BE \Rightarrow BD \times AD = AE \times BE$

Hence, option C is correct.

10.



ΔABC is right angled at B.

Using Pythagoras theorem,

$AC^2 = AB^2 + BC^2$

AC = 10 cm

and in case of right angled triangle, radius lies on h hypotenuse and is the circumcircle of ΔABC.

∴ Radius of circumcircle = $\frac{10}{2}$ = 5 cm

Hence, option D is correct.