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

Triangle Quiz 3

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

1. ABC is an equilateral triangle and CD is the internal bisector of ∠C. If DC is produced to E such that AC = CE, then ∠CAE is equal to

A. 45° B. 75° C. 30° D. 15°

2. G is the centroid of the equilateral ΔABC. If AB = 10 cm then length of AG is

A. $\frac{5\sqrt{3}}{3}$ cm B. $\frac{10\sqrt{3}}{3}$ cm C. $5\sqrt{3}$ cm D. $10\sqrt{3}$ cm

3. The radius of the incircle of the equilateral triangle having each side 6 cm is

A. $2\sqrt{3}$ cm B. $\sqrt{3}$ cm C. $6\sqrt{3}$ cm D. 2 cm

4. If the three medians of a triangle are same then the triangle is

A. equilateral B. isosceles C. right-angled D. obtuse-angle

5. If ΔABC is an isosceles triangle with ∠C = 90° and AC = 5 cm then AB is :

A. 5 cm B. 5 cm C. $5\sqrt{2}$ cm D. 2.5 cm

6. ABC is an isosceles triangle such that AB = AC and ∠B = 35°. AD is the median to the base BC. Then ∠BAD is :

A. 70° B. 35° C. 110° D. 55°

7. In an isosceles triangle, if the unequal angle is twice the sum of the equal angles, then each equal angle is

A. 120° B. 60° C. 30° D. 90°

8. ΔABC is an isosceles triangle and AB = AC = 2a unit, BC = a unit. Draw AD ⊥ BC, and find the length of AD.

A. $\sqrt{15}$ a unit B. $\frac{\sqrt{15}}{2}$ a unit C. $\sqrt{17}$ a unit D. $\frac{\sqrt{17}}{2}$ a unit

9. ABC is an isosceles triangle with AB = AC. The side BA is produced to D such that AB = AD. If ∠ABC = 30°, then ∠BCD is equal to

A. 45° B. 90° C. 30° D. 60°

10. In a triangle ABC, AB = AC, ∠BAC = 40°. Then the external angle at B is:

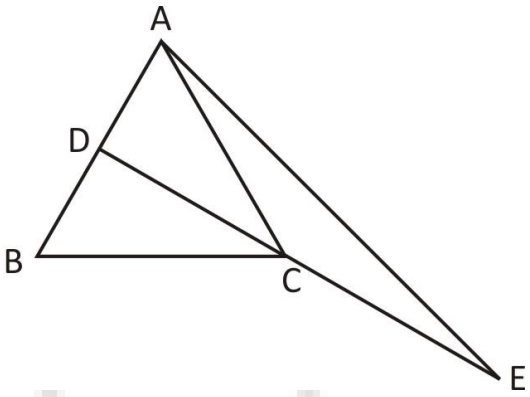
A. 90° B. 70° C. 110° D. 80°

Correct Answers:

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

Explanations:

1.



∠BCA = 60° [∵ ΔPQR is an equilateral]

∠BCD = ∠DCA = 30° [∵ CD is bisector of ∠C of an equilateral triangle]

∠DCE = 180°

∠ACE = 180° – 30° = 150°

∠CAE + ∠CEA = 180° – 150° = 30° ...(i)

Given, AC = CE

∴ ∠CEA = ∠CAE

From Eq. (i),

2∠CAE = 30°

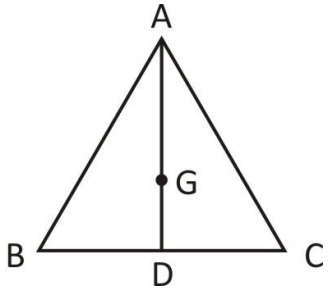
∴ ∠CAE = 15°

Hence, option D is correct.

2.

AB = 10 cm

∴ BD = $\frac{AB}{2}$ = 5 cm



∠ADB = 90°

By pythagoras theorem in ΔABD,

∴ AD = $\sqrt{AB^2 - BD^2}$

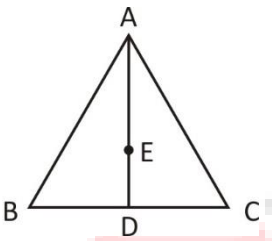
= $\sqrt{10^2 - 5^2} = \sqrt{75} = 5\sqrt{3}$ cm

We know that,

AG = $\frac{2}{3}$ AD = $\frac{2}{3} \times 5\sqrt{3} = \frac{10\sqrt{3}}{3}$ cm

Hence, option B is correct.

3.



Smart way :

Note : Radius of incircle of an equilateral triangle of side a = $\frac{a}{2\sqrt{3}}$.

∴ Required radius of the incircle = $\frac{6}{2\sqrt{3}} = \sqrt{3}$

Traditional method :

AB = 6 cm

∴ BD = AB = 3 cm

2

∠ADB = 90°

By pythagoras theorem in ΔABD,

∴ AD = $\sqrt{AB^2 - BD^2}$

= $\sqrt{6^2 - 3^2} = \sqrt{27} = 3\sqrt{3}$ cm

We know that,

$\therefore$ In-radius = $\frac{1}{3}$ AD

= $1 \times 3\sqrt{3} = \sqrt{3}$ cm

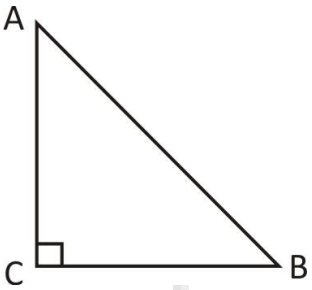
Hence, option B is correct.

4.

The median of an equilateral triangle are equal.

Hence, option A is correct.

5.



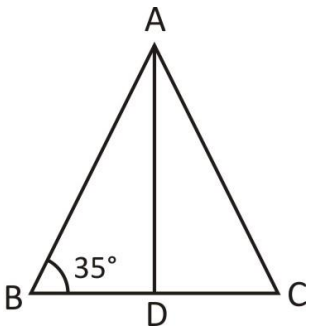
AC = BC = 5 cm

$\therefore$ AB = $\sqrt{AC^2 + BC^2}$

= $\sqrt{5^2 + 5^2} = \sqrt{50} = 5\sqrt{2}$cm

Hence, option C is correct.

6.



AB = AC

$\angle ACB = \angle ABC = 35°$

Now, $\angle ADB = 90°$

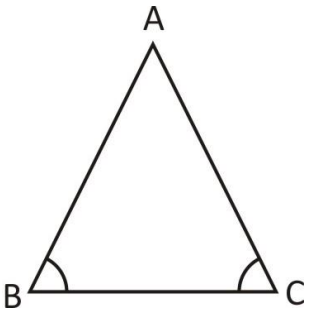
In ΔABD, We know that

$\angle ABD + \angle ADB + \angle BAD = 180°$

$\angle BAD = 180° - 90° - 35° = 55°$

Hence, option D is correct.

7.



Let, the equal angles are B and C, and unequal angle is A.

$\therefore \angle B = \angle C$

$\therefore \angle A = 2(\angle B + \angle C) = 2(\angle C + \angle C) = 4\angle C$

We know that,

$\angle A + \angle B + \angle C = 180°$

$4\angle C + \angle C + \angle C = 180°$

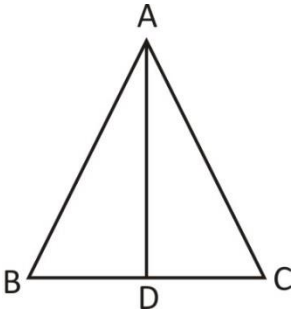
$6\angle C = 180°$

$\angle C = 30°$

$\therefore$ Each equal angle is 30°.

Hence, option C is correct.

8.



AB = AC = 2a units

BC = a units

BD = DC = a units

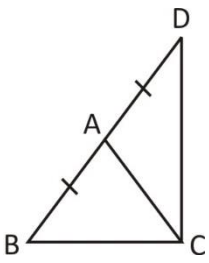
In ΔABD, By pythagoras theorem

$AD = \sqrt{AB^2 - BD^2}$

$= \sqrt{4a^2 - \frac{a^2}{4}} = \sqrt{\frac{15a^2}{4}} = \frac{\sqrt{15}}{2}$ a units

Hence, option B is correct.

9.



AB = AC = AD

∠ACB = ∠ABC = 30°

We know that, Exterior angle is equal to the sum of two interior opposite angles

∴ ∠DAC = ∠ABC + ∠ACB = 30° + 30° = 60°

In ΔACD,

AC = AD

∠ADC = ∠ACD

We know that,

∠ACD + ∠ADC + ∠DAC = 180°

∠ACD + ∠ACD + 60° = 180° [∵ ∠ACD = ∠ADC]

2∠ACD = 180° – 60° = 120°

∠ACD = 60°

Required angle, ∠BCD = ∠ACB + ∠ACD = 30° + 60° = 90°

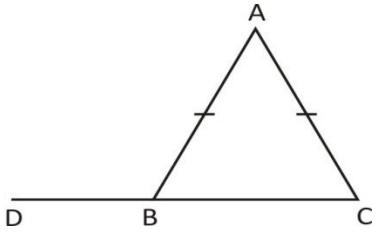
Hence, option B is correct.

10.

AB = AC

∴ ∠ACB = ∠ABC

∠BAC = 40° (given)



In ΔABC, we know that

$\angle ABC + \angle ACB + \angle BAC = 180°$

$\angle ABC + \angle ABC + 40° = 180°$ [$\because \angle ABC = \angle ACB$]

$2\angle ABC = 180° - 40° = 140°$

$\angle ABC = 70°$

External angle, $\angle ABD = 180° - 70° = 110°$

Hence, option C is correct.