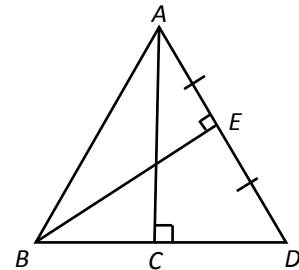## TB(3A) Ch. 3 Special Lines & Centres in a Triangle

Multiple Choice Questions

1. [13-14 Standardized Test 1]

In $\triangle ABD$, $AE = ED$, $AC \perp BD$ and $BE \perp AD$. Which of the following may not be correct?
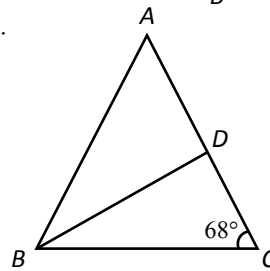
- **A.** AC is an altitude of $\triangle ABD$.
- **B.** AC is a median of $\triangle ABD$.
- **C.** BE is an angle bisector of $\triangle ABD$.
- **D.** BE is a perpendicular bisector of $\triangle ABD$.

2. [13-14 Standardized Test 1]

In $\triangle ABC$, $AB = AC$ and BD is an altitude. Find $\angle ABD$.

- **A.** $22°$
- **B.** $34°$
- **C.** $46°$
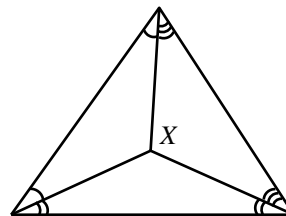- **D.** $58°$

3. [13-14 Mid-year Exam Q6]

The perimeter of $\triangle ABC$ is 32 cm and the length of AB is 10 cm. Which of the following are the possible lengths of the other two sides?

- **A.** 4 cm and 18 cm
- **B.** 6 cm and 16 cm
- **C.** 7 cm and 15 cm
- **D.** 8 cm and 12 cm

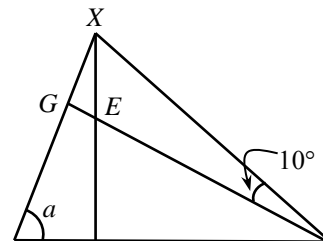**4. [13-14 Mid-year Exam Q11]**

In the figure, what is the name of centre X?

- **A.** Incentre
- **B.** Centroid
- **C.** Orthocentre
- **D.** Circumcentre

5. [13-14 Mid-year Exam Q13]

In the figure, E is the orthocentre of $\triangle XYZ$. XEF and GEZ are straight lines. Find $\angle FXZ$ in terms of a.

- **A.** a
- **B.** $a - 10°$
- **C.** $a + 10°$
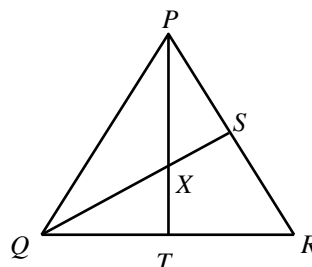- **D.** $90° - a$

6. [13-14 Mid-year Exam Q14]

In the figure, $\triangle PQR$ is an equilateral triangle. QS is a median and PT is an angle bisector. QS and PT intersect at X. Which of the following must be true?

- I. $PT \perp QR$
- II. $\angle R = 2\angle QPT$
- III. Area of $\triangle PQX = 2 \times$ Area of $\triangle QXT$
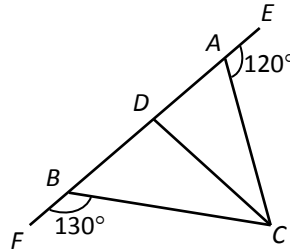
- **A.** I only

   B.   I and III only
   C.   II and III only
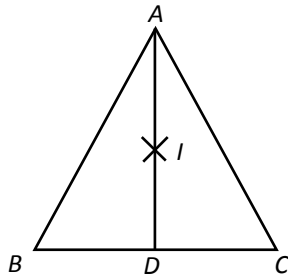   **D.**   All of the above

7.   **[13-14 Final Exam Q5]**

   In the figure, *EADBF* is a straight line and *CD* is the angle bisector of $\angle BCA$. Find $\angle BDC$.

   A.   85°
   B.   90°
   C.   95°
   D.   100°

8.   **[13-14 Final Exam Q21]**

   In the figure, *I* is the incentre of equilateral $\triangle ABC$ and *AID* is a straight line. Which of the following must be true?

   I.   *AI = ID*
   II.   *I* is also the centroid of $\triangle ABC$
   III.   Area of $\triangle ABI$ = 4 × Area of $\triangle BID$

   A.   II only
   B.   I and III only
   C.   II and III only
   D.   All of the above

9.   **[14-15 Mid-year Exam Q7]**

   Each of the following cases lists the lengths of 3 line segments. Which of them cannot form a triangle?

   A.   8, 1, 7   **B.**   9, 5, 8

   C.   10, 6, 8   **D.**   11, 11, 6
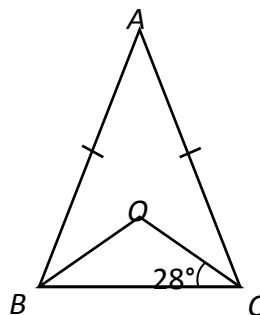
10. **[14-15 Mid-year Exam Q8]**

   ABC is an isosceles triangle where
   AB = AC. O is the incentre of $\triangle ABC$ and $\angle BCO = 28°$. Which of the following must be true?

   I.   *OB = OC*
   II. $\angle ABC = 56°$
      III. $\angle BAC = 68°$

   A.   I and II only
   B.   I and III only
   C.   II and III only
   D.   All of the above

11. [14-15 Mid-year Exam Q16]

Consider an equilateral triangle *ABC*. Which of the following lines coincide?

I.   Angle bisector of $\angle BAC$

II.   Median of $\triangle ABC$ from *A*

III. Perpendicular bisector of *BC*

A.   I and II only

B.   I and III only

C.   II and III only

D.   All of the above
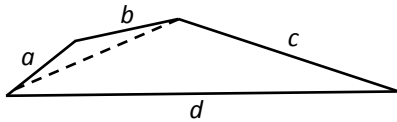
12. [14-15 Final Exam Q6]

In $\triangle ABC, \angle C = 90°$. Which of the following centres lies on *AB*?

A. Incentre   **B.** Centroid

C. Orthocentre   **D.** Circumcentre

13. [14-15 Final Exam Q29]

The figure shows a quadrilateral. Which of the following is a possible set of values of *a*, *b*, *c* and *d*?

A. $a = 1$, $b = 2$, $c = 3$, $d = 4$

B. $a = 1$, $b = 2$, $c = 4$, $d = 8$

C. $a = 1$, $b = 3$, $c = 6$, $d = 10$

D. $a = 1$, $b = 4$, $c = 9$, $d = 16$

14. [15-16 Mid-year Q3]

Which of the following sets of line segments can form a triangle?

A.   3 cm, 5 cm, 8 cm

B.   4.1 cm, 4.2 cm, 10 cm

C.   0.1 cm, 0.2 cm, $\sqrt{0.15}$ cm

D. $\sqrt{2}$ cm, $\sqrt{3}$ cm, $\sqrt{5}$ cm

15. [15-16 Mid-year Q4]

If $\triangle ABC$ is an obtuse-angled triangle, which of the following points lie inside $\triangle ABC$?

I.   The centroid of $\triangle ABC$

II.   The incentre of $\triangle ABC$

III. The orthocentre of $\triangle ABC$

A.   I and II only

    B.   I and III only
    C.   II and III only
    D.   I, II and III

16. **[15-16 Mid-year Q18]**

$\triangle OBC$ is an isosceles triangle where

$OB = OC$. O is the orthocentre of $\triangle ABC$ and $\angle BCO = 28°$. Which of the following must be true?

    I. $\angle BAC = 56°$
    II. $\triangle ABC$ is isosceles.
    III. Incentre of $\triangle ABC$
         lies on AO.
    A.   I and II only
    B.   I and III only
    C.   II and III only
    D.   I, II and III

17. **[15-16 Mid-year Q19]**

In $\triangle ABC$, M and N are mid-points of AB and AC respectively. O is the circumcentre of $\triangle ABC$, $\angle ABC = 2x + 10°$ and $\angle ACB = 2x + 20°$. Find $\angle MON$.
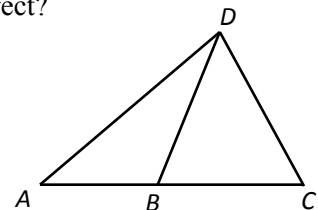
    A. $2x + 10°$.
    B. $2x + 15°$.
    C. $4x + 30°$.
    D. $4x + 60°$.
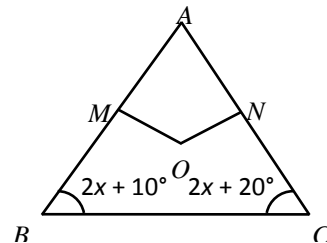
18. **[15-16 Final Exam Q7]**

In the figure, B is a point on AC. Which of the following may not be correct?

    A. $AB + BD > AD$
    B. $BC + CD > BD$
    C. $AD + CD > AB$
    D. $BD + CD > AB$

19. **[15-16 Final Exam Q30]**

If G is the centre of $\triangle ABC$ which lies outside the triangle, which of the following must be wrong?

    I. G is a centroid.
    II. G is an orthocentre.
    III. $\angle B < 90°$.

    A. I only
    B. II only
    C. I and II only
    D. I and III only

20. **[16-17 Mid-year Exam Q4]**

Which of the following cannot be the lengths of the three sides of a triangle?

    A.   4 cm, 6 cm, 8 cm
    B.   3.1 cm, 3.2 cm, 3.3 cm
    C.   7 cm, 7 cm, 7 cm
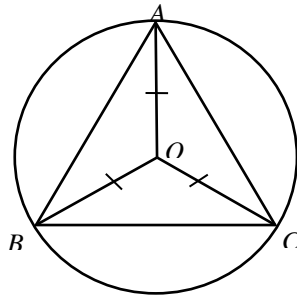
    D.   3 cm, 4 cm, 7 cm

21. **[16-17 Mid-year Exam Q7]**
Which of the following centres lie inside an obtuse-angled triangle?
I. Incentre
II. Centroid
III. Circumcentre
IV. Orthocentre

  A. I and II only

  B. I and III only

  C. II and IV only

  D. III and IV only

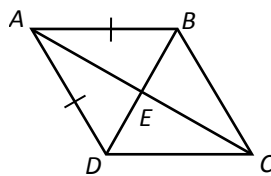**22.** **[16-17 Mid-year Exam Q8]**
In the figure, $OA = OB = OC$ and A, B and C lie on the same circle with O as the centre. What is the name of centre O?

  A. Incentre

  B. Centroid

  C. Circumcentre

  D. Orthocentre

23. **[16-17 Mid-year Exam Q19]**
In the figure, $ABCD$ is a quadrilateral. AEC and BED are straight lines. It is given that $AB = AD$ and BE is an angle bisector of $\triangle ABC$. Which of the following must be true?

I. $AB \mathbin{//} DC$
II. $AD \mathbin{//} BC$
III. BD is an angle bisector of $\triangle ACD$.

  A. II only
  B. I and II only
  C. II and III only
  D. I, II and III

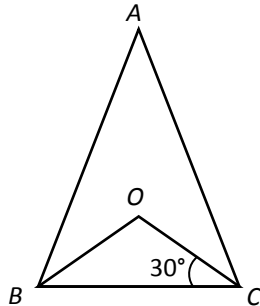**24.** **[16-17 Final Exam Q5]**
Which of the following sets of line segments cannot form a triangle?
  A. 1 cm, 3 cm, 5 cm

    B.   3 cm, 4 cm, 5 cm

    C.   7 cm, 7 cm, 7 cm

    D. $\sqrt{2}$ cm, $\sqrt{2}$ cm, 2 cm

25. **[16-17 Final Exam Q23]**

In the figure, *OBC* is an isosceles triangle where *OB* = *OC*. *OB* and *OC* bisect $\angle ABC$ and $\angle ACB$ respectively, and $\angle BCO = 30°$. Which of the following must be true?
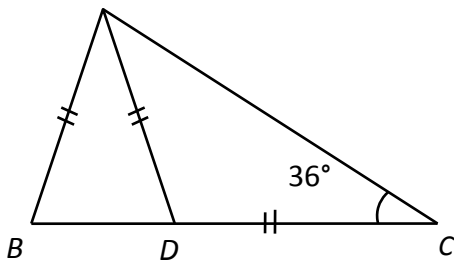

I. ΔABC is an equilateral triangle.

II.   Angle bisector of $\angle BAC$ passes through *O*.

III.   Perpendicular bisector of *BC* coincides with median of ΔABC from *A*.

    A.   I and II only

    B.   I and III only

    C.   II and III only

    D.   I, II and III

26. **[17-18 Mid-year Exam Q7]**

In the figure, *AB* = *AD* = *CD* and *BDC* is a straight line. Which of the following centres of ΔABC lies on *AD*?

    A.   In-centre

    B.   Circumcentre

    C.   Centroid

    D.   Orthocentre

27. **[17-18 Mid-year Exam Q15]**

I is the in-centre of ΔABC. If $\angle ABC = 50°$ and $\angle BCA = 100°$, then $\angle BIC =$

    A.   70°.

    B.   75°.

    C.   105°.
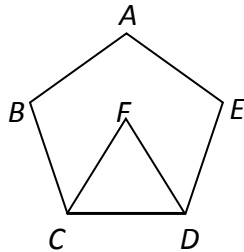
   D.   115°.

28. **[17-18 Mid-year Exam Q17]**

In the figure, *ABCDE* is a regular pentagon. ΔCFD is an equilateral triangle. Which of the following are true?

  I. $CF^2 + FD^2 > CD^2$

  II. $BC + ED > BE$

  III. $BC + DF > BF$

  A. I and II only

  B. I and III only

  C. II and III only

  D. I, II and III

29. **[17-18 Mid-year Exam Q19]**

In $\Delta ABC,\ \angle A = 90°$ and *D* is the mid-point of *BC*. Which of the following must be true?

  I.   *A* is the orthocentre of ΔABC.

  II. *D* is the circumcentre of ΔABC.

  III. ΔACD is an isosceles triangle.

  A. I and II only

  B. I and III only

  C. II and III only

  D. I, II and III

~ End ~