ExamPath

CLASS 9 MATHEMATICS · FBISE · UNIT 10

Unit 10: Practical Geometry — Advanced Practice

20 multiple-choice questions Suggested time: **20 minutes** 1 mark each

Name: Date: Score: / 20

Circle one answer for each question. The answer key with explanations is on the last pages, so try every question before you check. These are practice questions, not official FBISE papers.

1. Why is the in-centre always inside the triangle?

(A) Angle bisectors go from each vertex into the interior, so they always meet inside
(B) It is a midpoint of a side
(C) Bisectors are perpendicular to the sides
(D) All triangles are acute

2. A median of a triangle is 18 cm long. How far is the centroid from the vertex?

(A) 12 cm
(B) 9 cm
(C) 15 cm
(D) 6 cm

3. Where do the perpendicular bisectors of an obtuse-angled triangle meet?

(A) Outside the triangle
(B) At the midpoint of the hypotenuse
(C) They never meet
(D) Inside the triangle

4. If the in-centre, circumcentre, orthocentre and centroid of a triangle all coincide, what kind of triangle is it?

(A) Scalene right-angled
(B) Obtuse-angled
(C) Scalene acute-angled
(D) Equilateral

5. Two sides of 5.7 cm and 7.5 cm are given, with an angle of 105° opposite the 7.5 cm side. How many triangles can be constructed?

(A) Three
(B) Two
(C) One
(D) None

6. A circle must pass through all three vertices of a triangle. Which point is its centre?

(A) The circumcentre
(B) The in-centre
(C) The orthocentre
(D) The centroid

7. The point where the angle bisectors of a triangle meet is called the:

(A) circumcentre
(B) in-centre
(C) centroid
(D) orthocentre

8. In which type of triangle does the orthocentre coincide with a vertex?

(A) No triangle
(B) Obtuse-angled triangle
(C) Right-angled triangle
(D) Acute-angled triangle

9. Where do the altitudes of an obtuse-angled triangle meet?

(A) At the obtuse vertex
(B) At the midpoint of the longest side
(C) Inside the triangle
(D) Outside the triangle

10. In any triangle, which three points lie on one straight line?

(A) Circumcentre, orthocentre and centroid
(B) The three vertices
(C) In-centre, orthocentre and centroid
(D) In-centre, circumcentre and a vertex

11. Where do the perpendicular bisectors of the sides of a right-angled triangle meet?

(A) At the midpoint of the shortest side
(B) At the midpoint of the hypotenuse
(C) At the right-angled vertex
(D) Outside the triangle

12. If two angles and any side are given, how many triangles can be constructed?

(A) Two
(B) None
(C) Only one
(D) Infinitely many

13. Two sides of 4.8 cm and 4.3 cm are given, with an angle of 60° opposite the 4.3 cm side. How many triangles can be constructed?

(A) None
(B) Two
(C) Infinitely many
(D) One

14. Two sides of 2.3 cm and 5.4 cm are given, with an angle of 30° opposite the 2.3 cm side. Why can no triangle be constructed?

(A) The two sides are equal
(B) The angle is too large
(C) 5.4 cm is too short
(D) The arc of radius 2.3 cm does not reach the other arm of the angle

15. The point where the perpendicular bisectors of the sides of a triangle meet is called the:

(A) centroid
(B) circumcentre
(C) orthocentre
(D) in-centre

16. Why can a student find the in-centre of an equilateral triangle without bisecting angles?

(A) The in-centre is a vertex
(B) The in-centre lies on a side
(C) The centroid found by joining midpoints to vertices is the same point
(D) An equilateral triangle has no angles

17. The point where the altitudes of a triangle meet is called the:

(A) centroid
(B) circumcentre
(C) in-centre
(D) orthocentre

18. The centroid divides each median in the ratio:

(A) 1 : 1
(B) 2 : 1, measured from the vertex
(C) 1 : 2, measured from the vertex
(D) 3 : 1, measured from the vertex

19. Why is the case of two sides and a non-included angle called the ambiguous case?

(A) No triangle can ever be drawn
(B) The angle is too small to draw
(C) The sides are always equal
(D) We cannot be sure how many triangles can be constructed

20. Only one triangle can be constructed if the given data are:

(A) two sides and a non-included angle
(B) one side only
(C) two sides and their included angle
(D) two sides only

Answer key

Unit 10 · Advanced Practice

1 A	**2** A	**3** A	**4** D	**5** C
6 A	**7** B	**8** C	**9** D	**10** A
11 B	**12** C	**13** B	**14** D	**15** B
16 C	**17** D	**18** B	**19** D	**20** C

Explanations

1. **A. Angle bisectors go from each vertex into the interior, so they always meet inside**
The three angle bisectors of any triangle are concurrent inside it.

2. **A. 12 cm**
The centroid is 2/3 of the way from the vertex: 18 × 2/3 = 12 cm.

3. **A. Outside the triangle**
For an obtuse-angled triangle, the right bisectors of the sides meet outside it.

4. **D. Equilateral**
The four centres coincide only in an equilateral triangle.

5. **C. One**
The obtuse angle is opposite the longer side, so the arc cuts the arm once and only one triangle exists.

6. **A. The circumcentre**
The circumcentre is equally far from all three vertices.

7. **B. in-centre**
The angle bisectors meet at the in-centre, also called the inscribed centre.

8. **C. Right-angled triangle**
In a right-angled triangle the orthocentre is the vertex of the right angle.

9. **D. Outside the triangle**
For an obtuse-angled triangle, the altitudes, when extended, meet outside it.

10. **A. Circumcentre, orthocentre and centroid**
The circumcentre, orthocentre and centroid are collinear in every triangle.

11. **B. At the midpoint of the hypotenuse**
For a right-angled triangle, the circumcentre is the midpoint of the hypotenuse.

12. **C. Only one**
The third angle follows from the angle sum, so the triangle is fixed.

13. **B. Two**
The shortest distance from the end of the 4.8 cm side to the other arm is 4.8 × sin 60° ≈ 4.16 cm. The side 4.3 cm is longer than this but shorter than 4.8 cm, so the arc cuts the arm twice.

14. **D. The arc of radius 2.3 cm does not reach the other arm of the angle**
The shortest distance from the end of the 5.4 cm side to the other arm is 5.4 × sin 30° = 2.7 cm. An arc of 2.3 cm falls short.

15. **B. circumcentre**
The right bisectors of the sides meet at the circumcentre.

16. **C. The centroid found by joining midpoints to vertices is the same point**
In an equilateral triangle the centroid, found with medians, coincides with the in-centre.

17. **D. orthocentre**
The point of concurrency of the altitudes is the orthocentre.

18. **B. 2 : 1, measured from the vertex**
The part from the vertex to the centroid is twice the part from the centroid to the midpoint.

19. **D. We cannot be sure how many triangles can be constructed**
Depending on the lengths, there may be two triangles, one triangle or none.

20. **C. two sides and their included angle**
Two sides with the included angle fix a unique triangle. A non-included angle can give two, one or no triangle.

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