ExamPath

CLASS 9 MATHEMATICS · FBISE · UNIT 10

Unit 10: Practical Geometry — Exam Ready

25 multiple-choice questions Suggested time: **25 minutes** 1 mark each

Name: _____ Date: _____ Score: / 25

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. A line perpendicular to a segment that passes through its midpoint is called a:

(A) angle bisector
(B) altitude
(C) median
(D) right bisector

2. A student says angle bisectors are the same as right bisectors of sides. What is wrong?

(A) An angle bisector splits an angle; a right bisector is perpendicular at the midpoint of a side
(B) Nothing is wrong
(C) Right bisectors split angles
(D) Angle bisectors are always perpendicular

3. Which line segment of a triangle always lies inside it?

(A) A line through the circumcentre
(B) An altitude
(C) A right bisector
(D) A median

4. Why do the altitudes of a right-angled triangle meet at the right-angle vertex?

(A) The midpoint is there
(B) The hypotenuse is the shortest side
(C) The two sides at the right angle are already perpendicular, so they are altitudes
(D) All angles are equal

5. Which statement is true in every triangle?

(A) The centroid lies outside the triangle
(B) All four centres coincide
(C) The circumcentre, orthocentre and centroid are collinear
(D) The in-centre, orthocentre and centroid are collinear

6. Which statement about the centroid is true?

(A) It lies on the hypotenuse of a right triangle
(B) It is always inside the triangle
(C) It can be outside an obtuse triangle
(D) It is always the same as the orthocentre

7. Which given data does NOT fix a unique triangle?

(A) Two angles and one side
(B) Two sides and the included angle
(C) Two sides and a non-included angle
(D) Three sides

8. Points that lie on one straight line are called:

(A) concurrent
(B) parallel
(C) coincident
(D) collinear

9. The point where the medians of a triangle meet is also the triangle's centre of:

(A) radius
(B) gravity
(C) circumference
(D) rotation only

10. Two sides of 6.1 cm and 3.8 cm are given, with an angle of 30° opposite the 3.8 cm side. How many triangles can be constructed?

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

11. Why does "two angles and any side" always give exactly one triangle?

(A) It always uses an arc
(B) The sides are always equal
(C) The angles are always right angles
(D) The third angle follows from the angle sum, so shape and size are fixed

12. In ΔXYZ, $\angle X = 30°$ and $\angle Z = 105°$. Find $\angle Y$.

(A) 75°
(B) 45°
(C) 60°
(D) 135°

13. A line passes through the midpoint of a segment. Must it be the right bisector?

(A) No; it must be parallel to the segment
(B) No; it must also be perpendicular to the segment
(C) Yes, always
(D) Yes, if it is longer than the segment

14. A median is 15 cm long. How far is the centroid from the vertex?

(A) 10 cm
(B) 5 cm
(C) 7.5 cm
(D) 12 cm

15. A triangle with one angle greater than 90° is called:

(A) equilateral
(B) acute-angled
(C) right-angled
(D) obtuse-angled

16. In a right-angled triangle, where does the circumcentre lie?

(A) At the midpoint of the hypotenuse
(B) Outside the triangle
(C) At the midpoint of a shorter side
(D) At the right-angle vertex

17. How many bisectors does a line segment have, and how many are perpendicular to it?

(A) Infinitely many; only one is perpendicular
(B) Only one; it is perpendicular
(C) Two; both perpendicular
(D) Infinitely many; all perpendicular

18. A line segment joining a vertex to the midpoint of the opposite side is a:

(A) right bisector
(B) median
(C) angle bisector
(D) altitude

19. Which point is the centre of the circle that passes through all three vertices of a triangle?

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

20. In an equilateral triangle, how do the altitude, median, angle bisector and right bisector from a vertex relate?

(A) They coincide
(B) They are all different
(C) They are perpendicular to each other
(D) They are parallel

21. Two sides of 3 cm and 8 cm are given, with an angle of 30° opposite the 3 cm side. How many triangles can be constructed?

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

22. The ratio 2 : 1 for medians means the centroid is:

(A) on the opposite side
(B) twice as far from a vertex as from the midpoint of the opposite side
(C) outside the triangle
(D) equally far from the vertex and the midpoint

23. If two sides and a non-included angle are given, how many triangles are possible?

(A) Always exactly two
(B) Always exactly one
(C) Two, one or none, depending on the lengths
(D) Always none

24. The altitudes of a triangle are:

(A) concurrent
(B) parallel
(C) always equal
(D) collinear

25. AB = 6.8 cm and BC = 8.1 cm with ∠A = 90°, so BC is opposite the right angle. How many triangles can be constructed?

(A) Three

(B) Two

(C) None

(D) One

Answer key

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1 D	**2** A	**3** D	**4** C	**5** C
6 B	**7** C	**8** D	**9** B	**10** C
11 D	**12** B	**13** B	**14** A	**15** D
16 A	**17** A	**18** B	**19** A	**20** A
21 C	**22** B	**23** C	**24** A	**25** D

Explanations

1. D. right bisector
It is the right (perpendicular) bisector of the segment.

2. A. An angle bisector splits an angle; a right bisector is perpendicular at the midpoint of a side
They are different lines with different jobs.

3. D. A median
A median joins a vertex to the opposite side and always stays inside. Altitudes and right bisectors can fall outside.

4. C. The two sides at the right angle are already perpendicular, so they are altitudes
Each arm of the right angle is perpendicular to the other, so each is an altitude.

5. C. The circumcentre, orthocentre and centroid are collinear
The circumcentre, orthocentre and centroid always lie on one line.

6. B. It is always inside the triangle
The medians always meet inside the triangle.

7. C. Two sides and a non-included angle
Two sides and a non-included angle is the ambiguous case. The other three data sets give one triangle.

8. D. collinear
Collinear points lie on the same line.

9. B. gravity
The centre of gravity of a triangular body lies at the intersection of its medians.

10. C. Two
6.1 × sin 30° = 3.05 cm. The side 3.8 cm is longer than 3.05 cm but shorter than 6.1 cm, so there are two triangles.

11. D. The third angle follows from the angle sum, so shape and size are fixed
Two angles give the third angle. Together with a side, they fix the triangle.

12. B. 45°
180° − 30° − 105° = 45°.

13. B. No; it must also be perpendicular to the segment
Only the line through the midpoint that is also perpendicular is the right bisector.

14. A. 10 cm
The centroid is 2/3 of the way from the vertex: 15 × 2/3 = 10 cm.

15. D. obtuse-angled
An obtuse-angled triangle has one angle greater than 90°.

16. **A. At the midpoint of the hypotenuse**
The right bisectors of a right-angled triangle meet at the midpoint of the hypotenuse.

17. **A. Infinitely many; only one is perpendicular**
Many lines pass through the midpoint, but only one is perpendicular.

18. **B. median**
That segment is a median.

19. **A. The circumcentre**
The circumcentre is the meeting point of the right bisectors, and it is equally far from the three vertices.

20. **A. They coincide**
In an equilateral triangle these four lines are the same line.

21. **C. None**
8 × sin 30° = 4 cm, which is longer than 3 cm. The arc of 3 cm cannot reach the arm.

22. **B. twice as far from a vertex as from the midpoint of the opposite side**
The part from the vertex is twice the part from the midpoint.

23. **C. Two, one or none, depending on the lengths**
This is the ambiguous case, and the lengths decide the result.

24. **A. concurrent**
The three altitudes meet at one point, the orthocentre.

25. **D. One**
The side opposite the right angle must be the longest. 8.1 cm is longer than 6.8 cm, so exactly one triangle exists.

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