ExamPath

CLASS 9 MATHEMATICS · FBISE · UNIT 9

Unit 9: Geometry and Polygons — 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. Why can the interior angle of a regular polygon never be 180°?

(A) Regular polygons have at most six sides
(B) Straight angles cannot be interior
(C) Its exterior angle would be 0°, but exterior angles must add up to 360°
(D) Interior angles must be less than 90°

2. A square room has perimeter 48 ft and height 10 ft. What is the total area of its four inner walls?

(A) 144 ft^2
(B) 480 ft^2
(C) 120 ft^2
(D) 960 ft^2

3. Triangles ABC and DEF are similar and AB : DE = 2 : 3. Which statement is true?

(A) Area of ABC : area of DEF = 3 : 2
(B) Area of ABC : area of DEF = 8 : 27
(C) Area of ABC : area of DEF = 4 : 9
(D) Area of ABC : area of DEF = 2 : 3

4. Why does exactly one circle pass through three non-collinear points A, B and C?

(A) Any three points lie on infinitely many circles
(B) The centre must be the mid-point of AC
(C) The centre is where the angle bisectors meet
(D) The perpendicular bisectors of AB and BC meet at exactly one point equidistant from A, B and C

5. If one vertex of an n-sided polygon is joined to all non-adjacent vertices, how many triangles are formed?

(A) n − 2
(B) n − 3
(C) n
(D) n − 1

6. The perimeter of a regular polygon with n sides, each of length s, is:

(A) n × s
(B) n^2s
(C) n + s
(D) s ÷ n

7. The exterior angles of a polygon are (x + 4)°, (3x − 4)°, (7x − 3)°, (2x + 3)°, (8x − 1)° and (9x + 1)°. What is x?

(A) 15
(B) 12
(C) 10
(D) 14

8. Why must each step of a proof be justified by an axiom, a definition or an earlier theorem?

(A) Because diagrams are not allowed in proofs
(B) So that the conclusion follows logically and is guaranteed
(C) So that the result is easier to guess
(D) So that the proof becomes longer

9. Which regular polygon has its interior angle equal to its exterior angle?

(A) Regular hexagon
(B) Regular pentagon
(C) Equilateral triangle
(D) Square

10. The volumes of two similar solids are in the ratio 8 : 27. What is the ratio of their corresponding lengths?

(A) 2 : 3
(B) 8 : 27
(C) 4 : 9
(D) $\sqrt{8} : \sqrt{27}$

11. Why must the locus of points equidistant from two parallel lines lie midway between them?

(A) Parallel lines meet midway between them
(B) Equidistant points must lie on a circle
(C) The locus must be perpendicular to both
(D) A point nearer to one line than the other is not equidistant from both

12. A polygon with all sides equal and all interior angles equal is called:

(A) irregular
(B) regular
(C) scalene
(D) oblique

13. What is the sum of the interior angles of a 12-sided polygon?

(A) 1980°
(B) 1800°
(C) 2160°
(D) 1620°

14. Compare a regular 12-sided polygon with a regular hexagon. Which statement about their exterior angles is correct?

(A) They cannot be compared
(B) The 12-gon has the larger exterior angle
(C) The 12-gon has the smaller exterior angle: 30° against 60°
(D) They are equal

15. In equilateral triangle ABC, D is on AB and E is on AC with DE ∥ BC. Why is triangle ADE equilateral?

(A) D and E are mid-points of the sides
(B) Triangle ADE has a right angle
(C) Corresponding angles give $\angle D = \angle B = 60°$ and $\angle E = \angle C = 60°$
(D) DE is equal to BC

16. A mathematical statement is a sentence that is:

(A) either true or false, but not both
(B) always true
(C) always false
(D) neither true nor false

17. The locus of points in a plane at a distance a from a fixed line l is:

(A) a pair of lines parallel to l, one on each side
(B) a single line parallel to l
(C) a circle of radius a
(D) the perpendicular bisector of l

18. Why is the angle sum of a quadrilateral 360°?

(A) Its diagonals are always equal
(B) Its exterior angles sum to 180°
(C) A quadrilateral always has four right angles
(D) A diagonal splits it into two triangles, each with angle sum 180°

19. Two similar cylinders have radii 3 ft and 2 ft. The smaller has volume 40 ft^3. What is the volume of the larger?

(A) 90 ft^3
(B) 60 ft^3
(C) 135 ft^3
(D) 120 ft^3

20. Two similar pyramids have corresponding lengths 14 cm and 10 cm. The larger has surface area 392 cm^2. What is the surface area of the smaller?

(A) 200 cm^2
(B) 196 cm^2
(C) 280 cm^2
(D) 250 cm^2

21. Priya says rectangles of size 2 × 3 and 4 × 9 are similar because both have right angles. Why is she wrong?

(A) Only squares can be rectangles
(B) Their sides are not proportional, since $2/4 \neq 3/9$
(C) Right angles are not equal angles
(D) Rectangles can never be similar

22. For two similar figures, the ratio of their areas equals:

(A) the ratio of corresponding lengths
(B) the sum of the ratios
(C) the square of the ratio of corresponding lengths
(D) the cube of the ratio of corresponding lengths

23. A mathematical statement that has been proved true from accepted statements is called a:

(A) theorem
(B) postulate
(C) axiom
(D) conjecture

24. The sum of the exterior angles of a regular polygon, taking one at each vertex, is:

(A) $(n - 2) \times 180°$

(B) $n \times 180°$

(C) $180°$

(D) $360°$

25. Which of the following is a mathematical statement?

(A) Add 5 to x

(B) Is 7 a prime number?

(C) $x + 2$

(D) The sum of the angles of a triangle is 180°

Answer key

Unit 9 · Exam Ready

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

Explanations

1. C. Its exterior angle would be 0°, but exterior angles must add up to 360°
Interior + exterior = 180°. A 180° interior angle leaves 0° exterior, which cannot add up to 360°.

2. B. 480 ft^2
Side = 48 ÷ 4 = 12 ft. Four walls have area 4 × 12 × 10 = 480 ft^2.

3. C. Area of ABC : area of DEF = 4 : 9
Areas are in the ratio $2^2 : 3^2 = 4 : 9$.

4. D. The perpendicular bisectors of AB and BC meet at exactly one point equidistant from A, B and C
The meeting point O has OA = OB = OC, so it is the unique centre (circumcentre).

5. A. n − 2
A hexagon gives 4 triangles, so the general result is n − 2, which is why the angle sum is (n − 2) × 180°.

6. A. n × s
Perimeter is the sum of the n equal sides: P = ns.

7. B. 12
The sum is 360°: 30x = 360, so x = 12.

8. B. So that the conclusion follows logically and is guaranteed
A proof is a chain of logical steps. Each link must rest on something already accepted.

9. D. Square
Interior + exterior = 180°, so each must be 90°. Only the square has 90° exterior angles.

10. A. 2 : 3
Volume ratio = $(\text{length ratio})^3$. The cube root of 8 : 27 is 2 : 3.

11. D. A point nearer to one line than the other is not equidistant from both
Equal distances to both lines can only occur on the parallel line halfway between them.

12. B. regular
Equal sides and equal angles together define a regular polygon.

13. B. 1800°
(12 − 2) × 180° = 10 × 180° = 1800°.

14. C. The 12-gon has the smaller exterior angle: 30° against 60°
Exterior angle = 360° ÷ n. More sides give smaller exterior angles: 360 ÷ 12 = 30 and 360 ÷ 6 = 60.

15. C. Corresponding angles give ∠D = ∠B = 60° and ∠E = ∠C = 60°
With DE ∥ BC, the corresponding angles are equal, so all three angles of ADE are 60°.

16. **A. either true or false, but not both**
A statement has a definite truth value. Open sentences and questions do not.

17. **A. a pair of lines parallel to l, one on each side**
Points can lie a distance a on either side of l, giving two parallel lines.

18. **D. A diagonal splits it into two triangles, each with angle sum 180°**
(4 − 2) × 180° = 360°. The general idea is the same as for the (n − 2) triangles in any polygon.

19. **C. 135 ft^3**
Volume ratio = $(3/2)^3 = 27/8$, so the volume = $40 \times 27/8 = 135\ ft^3$.

20. **A. 200 cm^2**
Area ratio = $(10/14)^2 = 25/49$. So the area = $392 \times 25/49 = 200\ cm^2$.

21. **B. Their sides are not proportional, since 2/4 ≠ 3/9**
Similar figures need equal angles and proportional sides. Here 2/4 = 1/2 but 3/9 = 1/3.

22. **C. the square of the ratio of corresponding lengths**
Area is two-dimensional, so the length ratio is squared.

23. **A. theorem**
Axioms and postulates are assumed; theorems are proved.

24. **D. 360°**
It is 360° for every polygon.

25. **D. The sum of the angles of a triangle is 180°**
Only the first is a complete sentence with a definite truth value. A question, an instruction and an expression are not statements.

Free practice from ExamPath (exampath.org). You may print and share for study. Take this test online with a timer and instant checking at exampath.org.