ExamPath

CLASS 9 MATHEMATICS · FBISE · UNIT 9

Unit 9: Geometry and Polygons — 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. An architect builds a model of a building to a scale of 1 : 20. The model's roof has an area of 3 m^2. What is the area of the actual roof?

(A) 60 m^2
(B) 24,000 m^2
(C) 240 m^2
(D) 1200 m^2

2. Why can no regular polygon have an exterior angle of 50°?

(A) 50° is not a factor of 180°
(B) Exterior angles must be right angles
(C) Exterior angles must be less than 45°
(D) 360° ÷ 50° = 7.2 is not a whole number of sides

3. A regular hexagonal plot has sides of 10 m. Fencing costs Rs 160 per metre. What is the total fencing cost?

(A) Rs 9,600
(B) Rs 960
(C) Rs 6,000
(D) Rs 1,600

4. A student says, 'If the sides of a square are doubled, its area doubles too.' Why is this wrong?

(A) Area scales as the cube of the length ratio, so it becomes 8 times
(B) Area stays the same
(C) Area scales as the square of the length ratio, so it becomes 4 times
(D) Area becomes 3 times

5. Why can no polygon have an interior angle sum of 9 right angles?

(A) (n − 2) × 180° = 810° gives n = 6.5, which is not a whole number
(B) The sum of interior angles must be a multiple of 360°
(C) 810° is larger than 360°
(D) Polygons have at most 8 sides

6. Each interior angle of a regular polygon is 156°. How many sides does it have?

(A) 15
(B) 14
(C) 16
(D) 12

7. When the edge of a cube is doubled, why does its volume become 8 times rather than 2 times?

(A) Volume is a linear measure

(B) Surface area scales by 8

(C) Volume depends on three lengths, so it scales by 2^3

(D) Volume depends on two lengths, so it scales by 2^2

---

8. Two lines cross at O, and P moves so that it is always equidistant from both. Why does P trace two lines rather than one?

(A) P moves in a circle around O

(B) The lines form two pairs of vertically opposite angles, and each pair has its own bisector

(C) P also lies on the two given lines

(D) The perpendicular bisector is also included

---

9. 'If a polygon is regular, then all its sides are equal.' Is the converse true?

(A) Yes, always

(B) No; a regular polygon cannot have equal sides

(C) No; a rhombus has equal sides but is not regular

(D) Yes, because equal sides force equal angles

---

10. Aliya checks $n^2 + n + 41$ for n = 1, 2, 3 and gets primes, so she conjectures it is always prime. Nadeem shows n = 40 gives $1681 = 41^2$. What does his example show?

(A) The conjecture holds for odd n only

(B) A single counterexample disproves a conjecture, while many examples cannot prove it

(C) The conjecture is now proved true

(D) Checking examples is as good as a proof

---

11. The area of a regular polygon with perimeter P and apothem a is:

(A) $\frac{1}{2}$ P a

(B) $\frac{1}{2}$ P a^2

(C) P^2/a

(D) P a

---

12. The ratio of the volumes of two similar solids is equal to:

(A) the cube of the ratio of corresponding lengths

(B) the ratio of corresponding lengths

(C) the square of the ratio of corresponding lengths

(D) twice the ratio of corresponding lengths

---

13. A small water tank holds 40 litres. A similar tank is 3 times as tall. How many litres does the larger tank hold?

(A) 120 litres

(B) 360 litres

(C) 240 litres

(D) 1080 litres

---

14. Which statement about congruent and similar triangles is correct?

(A) Congruent triangles are never similar
(B) Congruent triangles are similar, but similar triangles need not be congruent
(C) Similar triangles must have equal areas
(D) Similar triangles are always congruent

---

15. The apothem of a regular polygon is the:

(A) length of one side
(B) perpendicular distance from the centre to a side
(C) length of a diagonal
(D) distance from the centre to a vertex

---

16. Which statement about a locus is complete?

(A) Every point on it lies at the same distance from the origin
(B) It always consists of one straight line
(C) Only the points on it satisfy the condition
(D) Every point on it satisfies the condition, and every point satisfying the condition lies on it

---

17. The number of diagonals in a polygon with n sides is:

(A) n − 3
(B) n(n − 1)/2
(C) n(n − 3)/2
(D) n(n − 2)/2

---

18. Points A and B are fixed. Point P moves so that PA = PB. Why does P trace a straight line and not a circle?

(A) P moves parallel to AB
(B) P stays a fixed distance from A
(C) P stays a fixed distance from B
(D) P stays on the perpendicular bisector of AB

---

19. A result that follows easily from an already proved theorem is called a:

(A) converse
(B) axiom
(C) corollary
(D) conjecture

---

20. A statement formed by interchanging the hypothesis and the conclusion of an 'if–then' statement is its:

(A) corollary
(B) converse
(C) conjecture
(D) theorem

Answer key

Unit 9 · Advanced Practice

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

Explanations

1. D. 1200 m^2
Lengths scale by 20, so areas scale by $20^2 = 400$. Area = 3 × 400 = 1200 m^2.

2. D. 360° ÷ 50° = 7.2 is not a whole number of sides
For a regular n-sided polygon, n = 360° ÷ (exterior angle). A non-integer n is impossible.

3. A. Rs 9,600
Perimeter = 6 × 10 = 60 m. Cost = 60 × 160 = Rs 9,600.

4. C. Area scales as the square of the length ratio, so it becomes 4 times
If the side changes from s to 2s, the area changes from s^2 to $4s^2$, which is 4 times larger.

5. A. (n – 2) × 180° = 810° gives n = 6.5, which is not a whole number
9 right angles = 810°. Then n – 2 = 810 ÷ 180 = 4.5, so n = 6.5, but the number of sides must be a whole number.

6. A. 15
Exterior angle = 180° – 156° = 24°, so n = 360° ÷ 24° = 15.

7. C. Volume depends on three lengths, so it scales by 2^3
$V = a^3$, so $(2a)^3 = 8a^3$.

8. B. The lines form two pairs of vertically opposite angles, and each pair has its own bisector
The locus is the pair of angle bisectors. They are perpendicular to each other and cross at O.

9. C. No; a rhombus has equal sides but is not regular
The converse says equal sides make a polygon regular. A rhombus has four equal sides but its angles are not all equal.

10. B. A single counterexample disproves a conjecture, while many examples cannot prove it
1681 = 41 × 41 is not prime, so the conjecture is false. Examples can support a conjecture but never prove it.

11. A. ½ P a
The polygon splits into n triangles of base s and height a. Total area = n × ½ s a = ½ (ns) a = ½ P a.

12. A. the cube of the ratio of corresponding lengths
Volume involves three dimensions, so the length ratio is cubed.

13. D. 1080 litres
Volumes scale by the cube of the length ratio: 40 × 3^3 = 40 × 27 = 1080 litres.

14. B. Congruent triangles are similar, but similar triangles need not be congruent
Triangles with sides 3, 4, 5 and 6, 8, 10 are similar but not congruent. Congruent triangles are similar with ratio 1.

15. B. perpendicular distance from the centre to a side
It is also the radius of the inscribed circle of the polygon.

16. **D. Every point on it satisfies the condition, and every point satisfying the condition lies on it**
A locus is the exact set of points meeting the condition, with none missing and none extra.

17. **C. n(n – 3)/2**
Each vertex gives n – 3 diagonals, and each diagonal is counted twice, so the total is n(n – 3)/2.

18. **D. P stays on the perpendicular bisector of AB**
A fixed distance from one point gives a circle. Equal distances from two points give their perpendicular bisector.

19. **C. corollary**
A corollary is a direct consequence of a theorem.

20. **B. converse**
The converse of 'If p then q' is 'If q then p'.

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.