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Class 09 - Mathematics

1. The number of planes passing through 3 noncollinear points is [1]
a) 1 b) 2
c) 4 d) 3
2. The number of end points a line segment has: [1]
a) 0 b) 1
c) 2 d) 3
3. If $\overline{AB} = \overline{PQ}$ and $\overline{PQ} = \overline{XY}$, then [1]
a) $\overline{AB} \neq \overline{XY}$ b) $\overline{AB} > \overline{XY}$
c) $\overline{AB} < \overline{XY}$ d) $\overline{AB} = \overline{XY}$
4. Greek's emphasised on: [1]
a) Practical use of geometry b) Inductive reasoning
c) Both Deductive reasoning and Inductive reasoning d) Deductive reasoning
5. A statement whose truth can easily be deduced from a theorem is called [1]
a) Report b) Axiom
c) Corollary d) Postulate
6. If a straight line falling on two straight lines makes the interior angles on the same side of it taken together less than 180° , then the two straight lines, if produced indefinitely, meet on that side on which the angles taken together are [1]
a) $< 180^\circ$ b) $= 180^\circ$
c) $> 180^\circ$ d) $\neq 180^\circ$
7. If AB, AC, AD and AE are parallel to a line q, then the points A, B, C, D and E are [1]
a) Non-collinear b) Collinear
c) Intersecting d) Scalar
8. A pyramid is a solid figure, the base of which is [1]
a) only a rectangle b) any polygon
c) only a square d) only a triangle
9. If a straight line falling on two straight lines makes the interior angles on the same side of it taken [1]

together less than two right angles, then the two straight lines, if produced indefinitely, meet on that side on which the sum of angles is _____ two right angles.

- a) More than
b) Less than
c) Can't be determined
d) Equal to

10. Euclid divided his famous treatise "The Elements" into [1]
a) 13 chapters
b) 11 chapters
c) 9 chapters
d) 12 chapters

11. Thales belongs to the country: [1]
a) Babylonia
b) Egypt
c) Rome
d) Greece

12. "Lines are parallel if they do not intersect" is stated in the form of [1]
a) A postulate
b) An axiom
c) A proof
d) A definition

13. The number of interwoven isosceles triangles in Sriyantra (in the Atharvaveda) is: [1]
a) Nine
b) Eight
c) Eleven
d) Seven

14. Euclid stated that all right angles are equal to each other in the form of [1]
a) A definition
b) A proof
c) An axiom
d) A postulate

15. If a point C lies between A and B then $AC + BC = \underline{\hspace{1cm}}$. [1]
a) AB
b) 2 AB
c) 2BC
d) $\frac{1}{2}AB$

16. A solid has _____. [1]
a) 1 dimension
b) 0 dimension
c) 3 dimensions
d) 2 dimension

17. The boundaries of the solids are [1]
a) Surfaces
b) lines
c) Curves
d) points

18. In Ancient India, Altars with combination of shapes like rectangles, triangles and trapeziums were used for: [1]
a) societal rituals
b) Household rituals
c) Public worship
d) Both Public worship and Household rituals

19. The number of dimension, a point has [1]
a) 1
b) 0

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- a) A definition
b) A proof
c) An axiom
d) A postulate

15. If a point C lies between A and B then $AC + BC = \underline{\hspace{2cm}}$. **[1]**

- a) AB b) 2 AB
c) 2BC d) $\frac{1}{2}$ AB

16. A solid has _____. [1]

- a) 1 dimension b) 0 dimension
c) 3 dimensions d) 2 dimension

17. The boundaries of the solids are [1]

- a) Surfaces b) lines
c) Curves d) points

18. In Ancient India, Altars with combination of shapes like rectangles, triangles and trapeziums were **11** used for:

- a) societal rituals
- b) Household rituals
- c) Public worship
- d) Both Public worship and Household rituals

19. The number of dimension, a point has [1]

- a) 1 b) 0

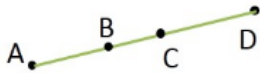
- c) 2 d) 3
20. The number of dimensions, a solid has [1]
a) 0 b) 1
c) 2 d) 3
21. Pythagoras was influenced by [1]
a) Euclid b) Thales
c) Archimedes d) Aryabhata
22. A is of the same age as B and C is of the same age as B. Euclid's which axiom illustrates the relative ages of A and C? [1]
a) First axiom b) Third axiom
c) Fourth axiom d) Second axiom
23. Two distinct intersecting lines cannot be parallel to the _____ line. [1]
a) Same b) Both Same and Different
c) Different d) Each
24. The basic facts which are taken for granted, without proof, are called [1]
a) axioms b) theorems
c) lemmas d) propositions
25. Which of the following options has one fixed end point and can be extended in the other direction indefinitely? [1]
a) A line segment b) A ray
c) All of these d) A line
26. Three or more lines intersecting at the same point are said to be [1]
a) Non-Collinear b) Concurrent
c) Intersecting d) Collinear
27. A, B and C are three collinear points. How many lines can be determined by them? [1]
a) 2 b) 0
c) 1 d) 3
28. It is known that if $x + y = 10$ then $x + y + z = 10 + z$. The Euclid's axiom that illustrates this statement is: [1]
a) Third Axiom b) First Axiom
c) Second Axiom d) Fourth Axiom
29. The line segment with one end point at the centre and the other at any point on the circle is called _____. [1]
a) radius b) chord
c) sector d) diameter

30. Euclid stated that if equals are added to equals, the wholes are equal in the form of [1]
 a) A postulate b) A theorem
 c) An axiom d) A definition
31. A polygon is a closed figure made up of [1]
 a) three line segments only b) two line segments
 c) three or more line segments d) Four line segments only
32. Things which are equal to the same thing are _____ to one another. [1]
 a) Equal b) Perpendicular
 c) Parallel d) Not equal
33. Axioms are assumed [1]
 a) definitions b) theorems
 c) universal truths in all branches of mathematics d) universal truths specific to geometry
34. Pythagoras was a student of: [1]
 a) Euclid b) Archimedes
 c) Thales d) Both Thales and Euclid
35. The boundaries of surfaces are [1]
 a) lines and curves b) points
 c) surfaces d) curves
36. A and B have the same weight. If they gain weight by 3 kg, then [1]
 a) Weight of A < Weight of B b) Weight of A \neq Weight of B
 c) Weight of A = Weight of B d) Weight of A > Weight of B
37. The number of end points a ray has [1]
 a) 0 b) 2
 c) 3 d) 1
38. The number of line segments determined by three collinear points is [1]
 a) 3 b) 4
 c) 1 d) 2
39. Which of the following is not a rectilinear figure? [1]
 a) Square b) Rhombus
 c) Circle d) Rectangle
40. In ancient India, the shapes of altars used for household rituals were [1]
 a) rectangles and squares b) trapeziums and pyramids
 c) triangles and rectangles d) squares and circles

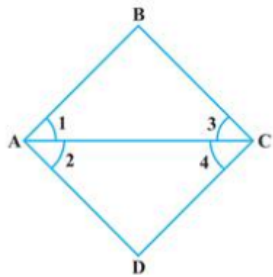
Section B

41. Point C is called a mid point of line segment AB, prove that every line segment has one and only one mid-point. [2]

42. In fig., if $AC = BD$, then prove that $AB = CD$ [2]



43. In the given figure, we have $\angle 1 = \angle 3$ and $\angle 2 = \angle 4$. Show that $\angle A = \angle C$. [2]

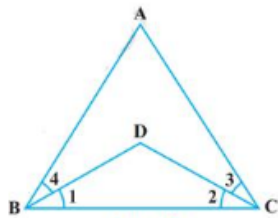


44. Why is axiom 5, in the list of Euclid's axioms, considered as a 'universal truth'? [2]

45. If P, Q, and R are three points on a line and Q is between P and R, then prove that $PR - QR = PQ$. [2]

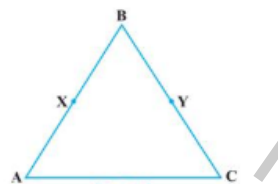
46. Given three distinct points in a plane, how many lines can be drawn by joining them? [2]

47. In the given figure, we have $\angle ABC = \angle ACB$, $\angle 4 = \angle 3$. Show that $\angle 1 = \angle 2$. [2]



48. How would you rewrite Euclid's fifth postulate so that it would be easier to understand? [2]

49. In the given figure, we have $BX = \frac{1}{2}AB$ and $BY = \frac{1}{2}BC$ and $AB = BC$. Show that $BX = BY$. [2]



50. Consider the statement: There exists a pair of straight lines that are everywhere equidistant from one another. Is this statement a direct consequence of Euclid's fifth postulate? Explain. [2]

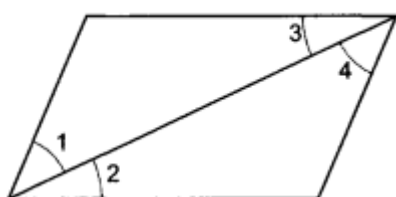
Section C

51. Read the following statement: [3]

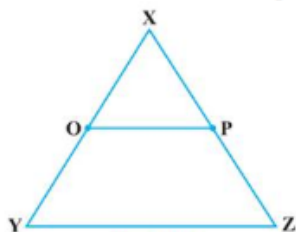
A square is a polygon made up of four line segments, out of which, length of three line segments are equal to the length of fourth one and all its angles are right angles.

Define the terms used in this definition which you feel necessary. Are there any undefined terms in this? Can you justify that all angles and sides of a square are equal?

52. In Fig., if $\angle 1 = \angle 3$, $\angle 2 = \angle 4$ and $\angle 3 = \angle 4$, write the relation between $\angle 1$ and $\angle 2$ using Euclid's axiom. [3]



53. In the given figure, if $OX = \frac{1}{2}XY$, $PX = \frac{1}{2}XZ$ and $OX = PX$, show that $XY = XZ$. [3]



54. Read the following axioms: [3]

- i. Things which are equal to the same thing are equal to one another.
- ii. If equals are added to equals, the wholes are equal.
- iii. Things which are double of the same thing are equal to one another.

Check whether the given system of axioms is consistent or inconsistent.

55. Does Euclid's fifth postulate imply the existence of parallel lines? Explain. [3]

Section D

56. **Read the case study carefully and answer the questions that follow:** [4]

Rahul has a fantasy of collecting the old stamp. So, one day he went to collect old stamps from two different market stores of the Indira Nagar market. So, Rahul decides to take 3 from each store.

- i. It is known that $a + b = 20$ and $a = c$. Show that $c + b = 20$. (1)
- ii. How many stamps remain with each store after Rahul's purchase? (1)
- iii. Solve the equation $y + 12 = 15$ and state the Euclid axiom used here. (2)

OR

If $p = q$ and $q = 7$, find $p + 5$ and state the Euclid axiom applied. (2)

57. **Read the case study carefully and answer the questions that follow:** [4]

Ravi was observing the boundary walls of his school when he noticed something interesting. The opposite walls appeared to be perfectly straight and parallel to each other. No matter how far he imagined extending them, they would never meet. Curious, he asked his teacher about this observation. His teacher explained that this is an example of Euclid's fifth postulate, also known as the parallel postulate, which states that if two straight lines are parallel, they never intersect, no matter how far they are extended. Ravi realized that this postulate is not just a part of geometry in textbooks but can also be seen in real life. Understanding this concept helps in designing structures accurately and maintaining proper alignment. Ravi felt excited to see mathematics reflected in the world around him.

- i. Which of Euclid's postulates is illustrated by the school walls that never meet? (1)
- ii. What is the main idea of Euclid's fifth postulate? (1)
- iii. Explain, with reference to the school walls, how Euclid's fifth postulate applies in daily life. (2)

OR

Why is it important to understand the concept of parallel lines in real life? (2)

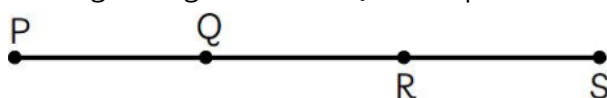
58. **Read the case study carefully and answer the questions that follow:** [4]

In last year, cyclone comes out in Andhra Pradesh. Due to this cyclone, many persons lost their lives and property. Deepak and Rohit decided to contribute equal amounts to National Disaster

Relief Fund, so that the suffered person get some relief.



- i. In this process, which axiom is used. Also write their statement. (1)
- ii. If Deepak contributed ₹ 30,000, then how much contribute the Rohit? (1)
- iii. In the given figure, if $PR = QS$, then prove that $PQ = RS$. (2)



OR

Euclid's third postulate: A circle can be drawn with any centre and any radius. (2)

59. **Read the case study carefully and answer the questions that follow:**

[4]

A 2 km long road is extended further in a straight path. This real-life situation can be related to Euclid's second postulate, which states:

A terminated line (line segment) can be produced indefinitely on both sides.

This postulate means that any straight line segment, like a measured road, can be extended endlessly in either direction while remaining straight. In geometry, this allows us to create longer lines from shorter ones and is foundational for drawing accurate diagrams and proving theorems. Euclid assumed this as a basic property of straight lines, helping us understand that straightness implies infinite extendibility.

- i. Which Euclid's postulate explains that a finite straight road can be made longer in the same straight direction? (1)
- ii. Can a line segment be extended in only one direction according to Euclid's second postulate? (1)
- iii. Explain how extending a 2 km road in a straight line relates to one of Euclid's postulates. (2)

OR

State Euclid's second postulate and give a real-life example. (2)

60. **Read the case study carefully and answer the questions that follow:**

[4]

In a cricket ground, the pitch is marked as a straight line between two stumps. This illustrates Euclid's first postulate, which states: A straight line can be drawn from any point to any other point. This means that between any two given points, such as the two sets of stumps, exactly one straight line exists. This fundamental idea is used not only in sports field marking but also in geometric constructions, ensuring clarity and uniqueness when defining linear paths in mathematics.

- i. Which Euclid's postulate explains that only one straight line passes through two distinct stumps? (1)
- ii. Can more than one straight line be drawn through a single given point? (1)

iii. State Euclid's first postulate and relate it to marking the cricket pitch. (2)

OR

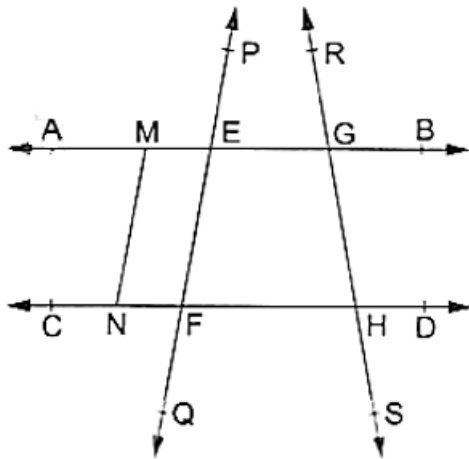
Explain why a curved line between the stumps would not satisfy Euclid's first postulate in this context. (2)

Section E

61. In the adjoining figure, name:

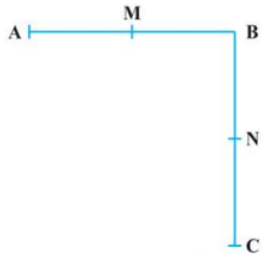
[5]

- i. Six points
- ii. Five line segments
- iii. Four rays
- iv. Four lines
- v. Four collinear points



62. i. $AB = BC$, M is the mid-point of AB and N is the mid-point of BC. Show that $AM = NC$.
 ii. $BM = BN$, M is the mid-point of AB and N is the mid-point of BC. Show that $AB = BC$.

[5]

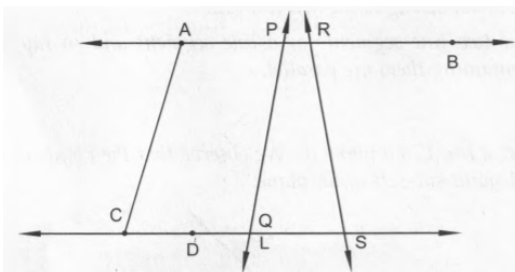


63. In a line segment AB point C is called a mid-point of line segment AB, prove that every line segment has one and only one mid-point.

[5]

64. In Fig, name the following:

[5]



- i. Five line segments
- ii. Five rays
- iii. Four collinear points
- iv. Two pairs of non-intersecting line segments

65. In the adjoining figure, name:

[5]

- i. Two pairs of intersecting lines and their corresponding points of intersection
- ii. Three concurrent lines and their points of intersection
- iii. Three rays
- iv. Two line segments

