QB365

Important Questions - Introduction to Euclid's Geometry

9th Standard CBSE

Mathematics Reg.No. : | | | | | |

Time : 01:00:00 Hrs

Total Marks : 50

Section-A

1) In ancient India, the shapes of altars used for household rituals were **1**

(a) squares and circles (b) triangles and rectangles (c) trapeziums and phyramids

(d) rectangles and squares

2) Euclid belonged to the country **1**

(a) Babylonia (b) Egypt (c) Greek (d) india

3) The number of line segments determined by three collinear points is: **1**

(a) two (b) Three (c) Only one (d) Four

4) 'lines are parallel if they do not intersect' is stated in the form of: **1**

(a) an axiom (b) a definition (c) a postulate (d) a proof

5) A proof is required for: **1**

(a) postulate (b) aximo (c) theorem (d) definition

6) The things which coincide with one another are: **1**

(a) equal to one another (b) un equal (c) double of same thing (d) triple of same thing

7) Euclid stated that things which are equal to the same thing are equal to one another in the form of: **1**

(a) an axiom (b) a definition (c) a postulate (d) a proof

8) Which of the following statement is incorrect? **1**

(a) A line segment has defined length

(b) Three line are concurrent id and only if they have a common point

(c) two lines drawn in a plane always intersected at a point

(d) One and only one line can be drawn passing through a given point parallel to a given line

9) " Two interesting lines cannot be parallel to the same line, is started in the form of: **1**

(a) an axiom (b) a definition (c) a postulate (d) a proof

10) John Playfair was a **1**

(a) french mathematician (b) Scottish mathematician (c) Indian mathematician

(d) Egyptian mathematician

Section-B

11) Consider the following statement: There exists a pair of straight lines that are everywhere equidistant from one another. Is this statement a **2**

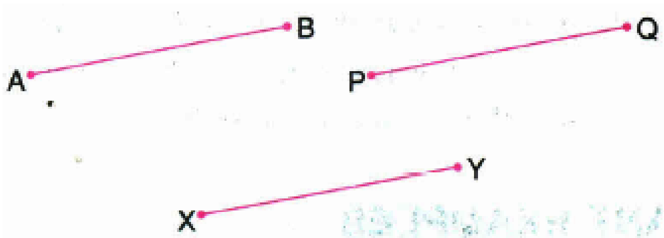
12) Which of the following statements are true and which are false? Give reasons for your answers: **2**

(i) Only one line can pass through a single point.

(ii) There are an infinite number of lines which pass through two distinct points.

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

(iv) If two circles are equal, then their radii are Equal.



13) Give a definition for each of the following terms. Are there other terms that need to be defined first? What are they, and how might you define them? **2**

(i) parallel lines (ii) perpendicular lines

(iii) line segment (iv) radius of a circle

(v') square.

14) Consider two 'postulates' given below: **2**

(l) Given any two distinct points A and B, there exists a third point C which is in between A and B.

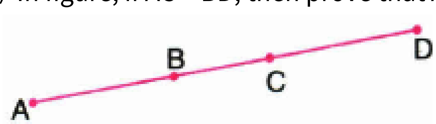
(ii) There exist at least three points that are not on the same line.

Do these postulates contain any undefined terms? Are these postulates consistent? Do they follow from Euclid's postulates? Explain.

15) If a point C lies between two points A and B such that AC = BC, then prove that $AC = \frac{1}{2}AB$. Explain by drawing the figure. **2**

16) In Question 4, point C is called a mid-point of line segment AB. Prove that every line segment has one and only one mid-point. **2**

17) In figure, if AC = BD, then prove that AB = CD. **2**



18) (i) Why is Axiom 5, in the list of Euclid's axioms, considered a 'universal truth'? (Note that the question is not about the fifth postulate). **2**

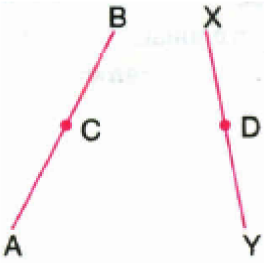
(ii) How would you rewrite Eulid's fifth postulate so that it would be easier to understand?

19) How would you rewrite Euclid's fifth postulate so that it would be easier to understand? **2**

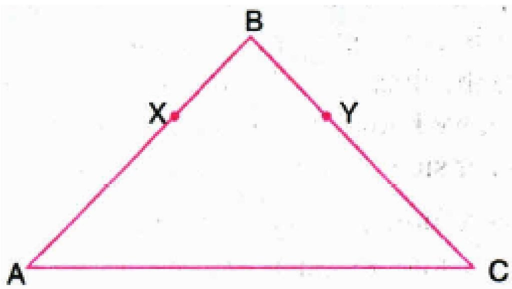
20) Does Euclid 's fifth postulate simply the existence of parallel lines? Explain. **2**

Section-C

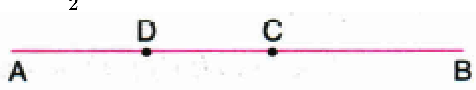
21) In figure, AC = XD, C is the midpoint of AB and D is the midpoint of XY. Using an Euclid's axiom, show that AB = XY. **5**



22) In the given figure AB = BC and BX = BY. Show that AX = CY. State Euclid's Axiom used. **5**



23) In figure, C is the mid-point of AB and Dis the mid-point of AC. Prove that AD = $\frac{1}{2}$AB. **5**



24) (i) If a point C lies between two points A and B such that AC = BC, then prove that AC= AB. **5**

(ii) Is CB = $\frac{1}{2}$AB?

(iii) Apala says that the ratio of AC and BC is 1 : 1. Is she correct? If so, which value of Apala is depicted by her statement?

(iv) Which mathematical concept has been covered in this problem?

(v) Write the formulae used in the solution

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Section-A

1) (a) squares and circles **1**

2) (c) Greek **1**

3) (b) Three **1**

4) (a) an axiom **1**

5) (c) theorem **1**

6) (a) equal to one another **1**

7) (a) an axiom **1**

8) (c) two lines drawn in a plane always intersected at a point **1**

9) (c) a postulate **1**

10) (b) Scottish mathematician **1**

Section-B

11) Yes 2

12) 2

(i) False. This can be seen visually.

(ii) False. This contradicts the Axiom.

[Given two distinct points, there is a unique line that passes through them.]

(iii) True by Euclid's Postulate

[A terminated line can be produced indefinitely.]

(iv) True. If we superimpose the region bounded by one circle on the other, then they coincide. So, their centres and boundaries coincide, therefore, their radii will coincide.

(v) True by the first Axiom of Euclid.

[Things which are equal to the same thing are equal to one another.]

13) 2

(i) Parallel lines. Lines which do not intersect anywhere are called parallel lines.

(ii) Perpendicular lines. Two lines which are at a right angle to each other are called perpendicular lines.

(iii) Line segment. It is a terminated line.

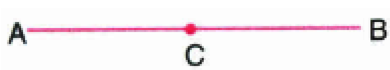
(iv) Radius. The length of the line segment joining the centre of a circle to any point on its circumference is called its radius.

(v) Square. A quadrilateral with all the four sides equal and all the four angles of measure 90° each is called a square.

14) 2

Yes! These postulates contain two undefined terms: Point and Line. Yes! These postulates are consistent because they deal with two different situations (i) says that given two points A and B, there is a point C lying on the line in between them, (ii) says that given A and B, we can take C not lying on the line through A and B. These 'postulates' do not follow from Euclid's postulates, however, they follow from Axiom 'Given two distinct lines, there is a unique line that passes through them.'

15) 2



AC=BC

AC + AC = BC + AC | Equals are added to equals

$\Rightarrow$ 2AC = AB I BC + AC coincides with AB

$\Rightarrow$ AC= $\frac{1}{2}$2AB .

$\Rightarrow$ AC=BC= $\frac{1}{2}$AB.

|Things which are equal to the same thing are equal to one another.

16) Let a line AB have two mid-points, say, C and D. Then, 2

AC = $\frac{1}{2}$ AB ...(1)

AD = $\frac{1}{2}$AB ...(2)

From (1) and (2),

AC = AD.

Things which are equal to the same thing are equal to one another

17) **2**

We have

AC = BD

$\Rightarrow$ AC - BC= BD - BC

If equals are subtracted from equals, the remainders are equal (Euclid's Axiom (iii))

$\Rightarrow$ AB = CD

AC - BC coincides with AB; BD - BC coincides with CD [Things which coincide with one another are equal to one another (Euclid's Axiom (iv))]

18) **2**

(i) Since this is true for anything in any part of the world, this is a universal truth.

(ii) If the sum of the cointerior angles made by a transversal intersect two straight lines at distinct points is less than 180^{o}, then the lines cannot be parallel.

19) Two distinct intersecting lines cannot be -parallel to the same line. **2**

20) **2**

If a straight line l falls on two straight lines m and n such that sum of the interior angles on one side of l is two right angles, then by Euclid's fifth postulate the lines m and n will not meet on this side of l. Next, we know that the sum of the interior angles on the other side of line l will also be two right angles. Therefore, they will not meet on the other side also. So, the lines m and n never meet and are, therefore arallel.

Section-C

21) AC=XD I Given **5**

2AC = 2XD

$\therefore$ Things which are double of the same things are equal to one another

$\Rightarrow$ AB = XY

$\therefore$ C is the midpoint of AB and D is the midpoint of XY

22) We have **5**

AB = BC

$\Rightarrow$ AB - BX = BC - BX

|If equals are subtracted from equals, the remainders are equal (Euclid's Axiom (iii))

AB - BX = BC - BY $|\because$ BX = BY

AB - BX coincides with AX;

BC - BY coincides with CY

[Things which coincide with one another are equal to one another (Euclid's Axiom (iv))]

23) $\because$ C is the midpoint of AB 5

$\therefore$ AC=CB

AC + AC = CB + AC

| If equals are added to equals, then the wholes are equal (Euclid's Axiom (ii))]

$\Rightarrow$ 2AC = AB I CB + AC coincides with AB

$\Rightarrow \frac{1}{2}(2AC) = \frac{1}{2}$ AB

| Things which are halves of the same thing are equal (Euclid's Axiom (vii»]

$\Rightarrow$ AC = $\frac{1}{2}$AB

$\Rightarrow \frac{1}{2}$AC = $\frac{1}{2}(\frac{1}{2}$AB)

| Things which are halves of the same thing are equal to one another (Euclid's Axiom (vii))]

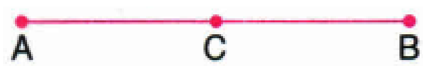
$\frac{1}{2}$AC = $\frac{1}{2}$AB

AD = $\frac{1}{4}$AB

$\because$D is the mid-point of AC

$\therefore$AD = DC = $\frac{1}{2}$AC (as above)

24) AC=BC I Given 5



$\Rightarrow$ AC+AC= BC+AC | If equals are added to equals, the wholes are equal.

$\Rightarrow$ 2AC= AB

AC= $\frac{1}{2}$ AB

(ii) AC = OC I Given

AC= $\frac{1}{2}$AB I Proved in (i) above

$\therefore$ CB= $\frac{1}{2}$ AB

(iii) AC=BC I Given

$\therefore$ AC: BC = 1 : 1

$\therefore$ Apala is correct. So, the value 'Sharpness' is depicted by her statement.

(iv) The mathematical concept 'Introduction to Euclid's Geometry' has been covered in this problem.

(v) The formulae used in the solution are as follows:

1. If equals are added to equals, the wholes are equal.

2. Concept of ratio.