# 5. Introduction to Euclid's Geometry

CBSE TREND SETTER PAPER _ 01



## Multiple Choice Questions

**1.** If the point P lies in between M and N and C is mid-point of MP, then :
(A) MC + PN = MN (B) MP + CP = MN (C) MC + CP = MN (D) CP + CN = MN
**(*CBSE*-2010-940109-A1, A2)**

**2.** Euclid stated that all right angles are equal to each other in the form of :
(A) an axiom (B) a definition (C) a postulate (D) a proof
**(*CBSE*-2011-460031; 2010-940111-A1)**

**3.** The things which are double of same thing are :
(A) equal (B) halves of same thing
(C) unequal (D) double of the same thing
**(*CBSE*-2010-940111-A1, A2)**

**4.** Euclid stated that if equals are subtracted from equals, the remainders are equals in the form of :
(A) an axiom (B) a postulate (C) a definition (D) a proof
**(*CBSE*-2010-940112-B1)**

**5.** The number of dimension(s), a surface has :
(A) 1 (B) 2 (C) 0 (D) 3
**(*CBSE*-2010-940112-A1, C1)**

**6.** A surface is that which has :
(A) length and breadth (B) length only
(C) breadth only (D) length and height
**(*CBSE*-2010-940114-B1)**

**7.** 'Lines are parallel if they do not intersect' is stated in the form of :
(A) an axiom (B) a definition (C) a postulate (D) a proof
**(*CBSE*-2010-940117-C1,C2)**

**8.** 'Two intersecting lines cannot be parallel to the same line' is stated in the form of :
(A) an axiom (B) a definition (C) a postulate (D) a proof
**(*CBSE*-2011-460024; 2010-940117-C2)**

**9.** The number of lines that can pass through a given point is :
(A) two (B) none (C) only one (D) infinitely many
**(*CBSE*-2010-940119-A1)**

**10.** The number of line segments determined by three collinear points is :
(A) two (B) three (C) only one (D) four
**(*CBSE*-2010-940119-B1)**

**11.** The number of line segments determined by three given non-collinear points is :
(A) two (B) three (C) infinitely many (D) four
**(*CBSE*-2010-940119-C1)**

**12.** A proof is required for :
(A) postulate (B) axiom (C) theorem (D) definition
**(*CBSE*-2010-940121-A1, A2)**

**13.** Two planes intersect each other to form a :
(A) plane (B) point (C) straight line (D) angle
**(*CBSE*-2010-940124-B1)**

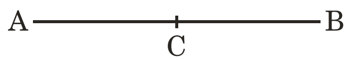
**14.** Which of the following needs a proof ?
(A) axiom (B) theorem (C) postulate (D) definition
**(*CBSE*-2010-940125-A1)**

**Ans. 1.** D; **2.** C; **3.** A; **4.** A; **5.** B; **6.** A; **7.** B; **8.** A; **9.** D; **10.** B; **11.** B; **12.** C; **13.** C; **14.** B.

**2 Mark Questions**

**Q. 1. 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.**
**(*CBSE*-2011-460020, 26, 33; 2010-940109-A1, A2, 940124-B1)**

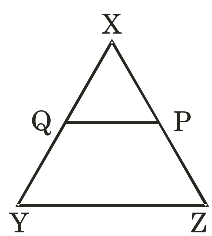
**Sol.** Given AC = BC




AC + AC = BC + AC
(if equals are added to equal the wholes are equal) 1
or 2AC = AB

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

**Q. 2. In figure given below, if QX = $\frac{1}{2}$XY, PX = $\frac{1}{2}$ XZ and QX = PX, show that XY = XZ.** **(*CBSE*-2010-940112-B1)**



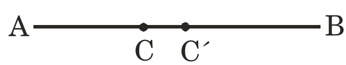

**Sol.** QX = PX (given) ½

$\frac{1}{2}$XY = $\frac{1}{2}$XZ ½

∴ XY = XZ 1

**Q. 3. Prove that every line segment has one and only one mid-point.**
**(*CBSE*-2011-460031; 2010-940112-C1)**

**Sol.** Suppose C and C' are two mid-points of line segment AB. ½



Then, $AC = \frac{1}{2}AB$ ½

and $AC' = \frac{1}{2}AB$ ½

$AC = AC'$ [Things which are equal to the same thing are equal to one another.]

This is possible only when C and C' coincide. ½

Hence, every line segment has one and only one mid-point.

**Q. 4. Define :**

**(A) line segment (B) radius of a circle (*CBSE*-2010-940117-C1)**

**Sol.** (A) A part of a line with two end-points is called a line segment. 1

(B) A line segment joining the centre of a circle to any point on a circle is called a radius of the circle 1

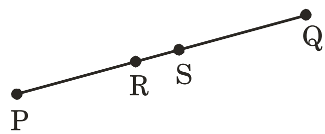
**Q. 5. Define :**

**(A) a square (B) perpendicular lines (*CBSE*-2010-940117-C2)**

**Sol.** (A) Square – A square is a rectangle with a pair of consecutive sides equal. 1

(B) Perpendicular lines – Two lines are said to be perpendicular, if the angle between them is 90°. 1

**Q. 6. In figure given below, if PS = RQ, then prove that PR = SQ.**
**(*CBSE*-2011-460021; 2010-940121-C1)**

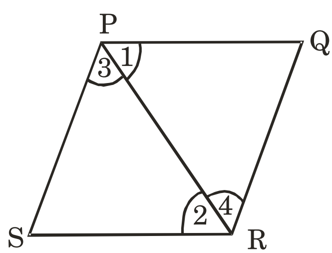



**Sol.** In fig, we have : $PS = RQ$

$\Rightarrow PR + RS = RS + SQ$ 1

So, by Axiom (3), $PR = SQ.$ 1

**Q. 7. In figure given below, it is given that ∠1 = ∠4 and ∠3 = ∠2. By which Euclid's axiom, it can be shown that if ∠2 = ∠4, then ∠1 = ∠3.**
**(*CBSE*-2011-460022, 32; 2010-940125-A1)**




**Sol.** Things which are equal to the same or equal things are equal to one another. 1
So, angles ∠1 and ∠3 which are equal to ∠4 and ∠2 respectively,
which are equal are again equal. 1

**Multiple Choice Questions**

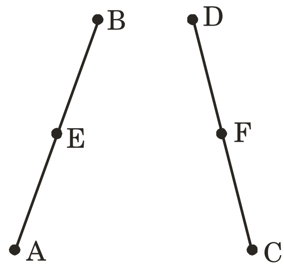
**1.** The things which coincide with one another are :
(A) equal to another (B) unequal
(C) double of same thing (D) Triple of same things
**(*CBSE*-2011-460035)**

**2.** Euclid stated that things which are equal to the same thing are equal to one another in the form of :
(A) an axiom (B) a definition (C) a postulate (D) a proof
**(*CBSE*-2011-460034)**

**Ans. 1.** A; **2.** C.

**2 Mark Questions**

**Q. 1. In figure given below, AE = DF, E is the mid-point of AB and F is the mid-point of DC. Using an Euclid axiom, show that AB = DC.**
**(*CBSE*-2011-460014, 15; 2010-940112-A1)**




| | | |
|---|---|---|
| **Sol.** AB = 2AE | (E is the mid point) | ½ |
| CD = 2DF | (F is the mid point) | ½ |
| Also AE = DF | (given) | |
| Therefore, AB = CD | (Things which are double of the same thing are equal to one another). | 1 |

**Q. 2.**



**In the above figure, if AB = PQ, PQ = XY, then AB = XY. State True or False. Justify your answer.** **(*CBSE*-2011-460024)**

**Sol.** True, Euclid's axiom, ½

Things which are equal to the same thing are equal to one another 1½

**Q. 3. Does Euclid's fifth postulate imply the existence of parallel lines? Explain.** **(*CBSE*-2011-460023)**

**Sol.** If a straight line $l$ falls on two straight lines $m$ and $n$ such that the sum of interior angles on same side of $l$ is 180°, then by Euclid's 5th postulate, the lines will not meet on this side of $l$.

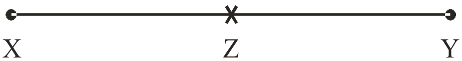
Also, the sum of interior angles on other side of $l$ will be 180°, they will not meet on the other side also.

$\Rightarrow$ $l$ and $m$ never meet

$\Rightarrow$ $l$ and $m$ are parallel. 2

**Q. 4. If a point Z lies on the line XY between two points X and Y such that XZ = YZ, then prove that XZ = $\frac{1}{2}$ XY.** **(*CBSE*-2011-460019)**

**Sol.**




$\because$ Z lies in the interior of XY

XY = XZ + ZY. (By addition axiom) ½

XY = XZ + XZ ($\because$ ZY = ZX) ½

XY = 2XZ ½

$XZ = \frac{1}{2}XY$ ½

Hence, the result.

**Q. 5. If a point P be the mid-point of a line segment AB, then prove**

**AP = BP = $\frac{1}{2}$ AB.** **(*CBSE*-2011-460034)**

**Sol.** P is the mid-point of segment AB and also lies in between A and B. 1

$\therefore$ AP + BP = AB

But AP = BP (Given)

$\therefore$ 2AP = 2BP = AB ½ + ½

$\therefore$ $AP = BP = \frac{1}{2}AB$