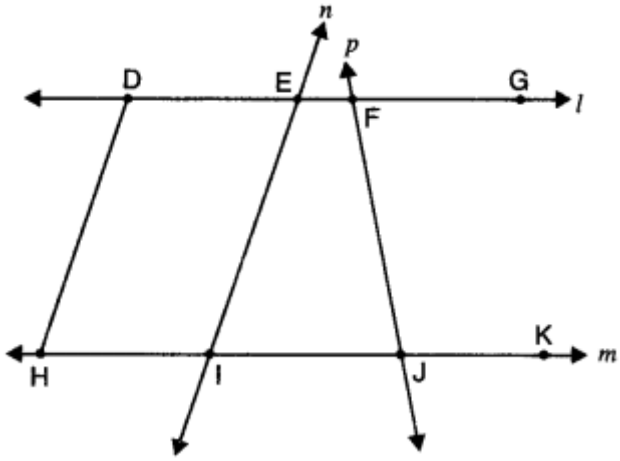
Chapter 5 Introduction to Euclid's Geometry Class 9 Important Questions NCERT Maths

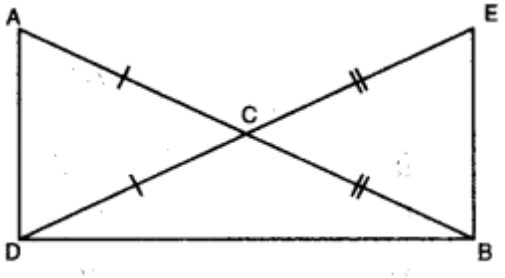
Question 1.
Define :
(a) a square (b) perpendicular lines.
Solution:
(a) A square : A square is a rectangle having same length and breadth. Here, undefined terms are length, breadth and rectangle.
(b) Perpendicular lines : Two coplanar (in a plane) lines are perpendicular, if the angle between them at the point of intersection is one right angle. Here, the term one right angle is undefined.

Question 2.
In the given figure, name the following :
(i) Four collinear points
(ii) Five rays
(iii) Five line segments
(iv) Two-pairs of non-intersecting line segments.



Solution:
(i) Four collinear points are D, E, F, G and H, I, J, K
(ii) Five rays are DG, EG, FG, HK, IK.
(iii) Five line segments are DH, EI, FJ; DG, HK.
(iv) Two-pairs of non-intersecting line segments are (DH, EI) and (DG, HK).

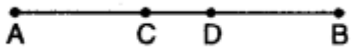
Question 3.
In the given figure, AC = DC and CB = CE. Show that AB = DE. Write the Euclid's axiom to support this.



Solution:
We have
AC = DC
CB = CE
By using Euclid's axiom 2, if equals are added to

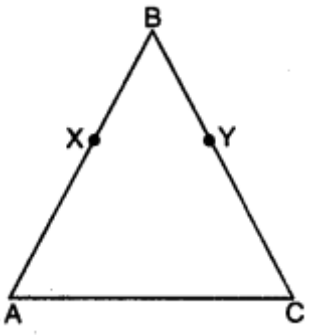
equals, then wholes are equal.
⇒ AC + CB = DC + CE
⇒ AB = DE.

Question 4.
In figure, it is given that AD=BC. By which Euclid's axiom it can be proved that AC = BD?



Solution:
We can prove it by Euclid's axiom 3. "If equals are subtracted from equals, the remainders are equal."
We have AD = BC
⇒ AD – CD = BC – CD
⇒ AC = BD

Question 5.
In the given figure, AB = BC, BX = BY, show that AX = CY.



Solution:
Given that AB = BC
and BX = BY
By using Euclid's axiom 3, equals subtracted from equals, then the remainders are equal, we have
AB – BX = BC – BY
AX = CY

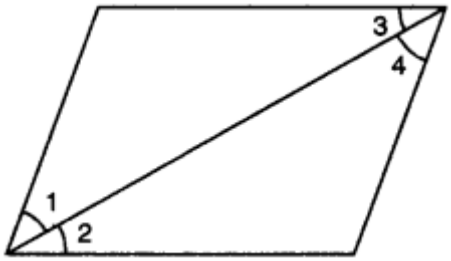
Question 6.

In the above figure, if AB = PQ, PQ = XY, then AB = XY. State True or False. Justify your answer.
Solution:
True. ∵ By Euclid's first axiom "Things which are equal to the same thing are equal to one another".
∴ AB = PQ and XY = PQ ⇒ AB = XY

Question 7.
In the given figure, if ∠1 = ∠3, ∠2 = ∠4 and ∠3 = ∠4, write the relation between ∠1 and ∠2, using an Euclid's axiom.

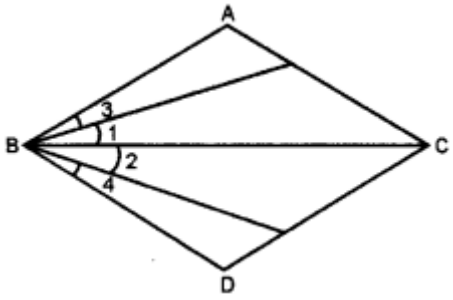
Solution:
Here, ∠3 = ∠4, ∠1 = ∠3 and ∠2 = ∠4. Euclid's first axiom says, the things which are equal to equal thing are equal to one another. So ∠1 = ∠2.,

Question 8.
In the given figure, we have ∠1 = ∠2, ∠3 = ∠4. Show that ∠ABC = ∠DBC. State the Euclid's Axiom used.



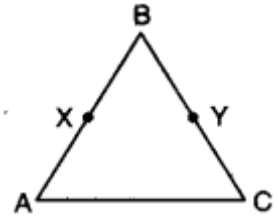
Solution:
Here, we have 1 = ∠2 and ∠3 = ∠4. By using Euclid's Axiom 2. If equals are added to
equals, then the wholes are equal..
∠1 + ∠3 = ∠2 + ∠4
∠ABC = ∠DBC.

Question 9.
In the figure, we have BX and 12 AB =12 BC. Show that BX = BY.



Solution:
Here, BX = 12 AB and BY = 12 BC ...(i) [given]
Also, AB = BC [given]
⇒ 12AB = 12BC ...(ii)
[∵ Euclid's seventh axiom says, things which are halves of the same thing are equal to one another]
From (i) and (ii), we have BX = BY

Question 10.
In the given figure, AC = XD, C is mid-point of AB and D is mid-point of XY. Using an Euclid's axiom, show that AB = XY.



Solution:
∵ C is the mid-point of AB
AB = 2AC
Also, D is the mid-point of XY
XY = 2XD
By Euclid's sixth axiom "Things which are double of same things are equal to one another."
∴ AC = XD = 2AC = 2XD ⇒ AB = XY