PM SHRI KENDRIYA VIDYALAYA GACHIBOWLI, GPRA CAMPUS, HYD-32

PRACTICE PAPER 06 (2024-25)

CHAPTER 05 INTRODUCTION TO EUCLID'S GEOMETRY

(ANSWERS)

SUBJECT: MATHEMATICS **MAX. MARKS : 40**

CLASS : IX **DURATION : 1½ hrs**

General Instructions:

(i). **All** questions are compulsory.
(ii). This question paper contains 2**0** questions divided into five Sections A, B, C, D and E.
(iii). **Section A** comprises of **10 MCQs** of **1 mark** each. **Section B** comprises of 4 questions of **2 marks** each. **Section C** comprises of 3 questions of **3 marks** each. **Section D** comprises of 1 question of **5 marks** each and **Section E** comprises of 2 Case Study Based Questions of **4 marks** each.
(iv). There is no overall choice.
(v). Use of Calculators is not permitted

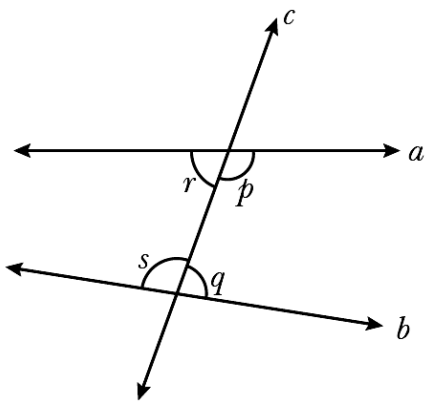
SECTION – A

Questions 1 to 10 carry 1 mark each.

1. Consider the statements below.
(i) A straight line can be drawn joining any two points.
(ii) Two distinct lines can have only one point common.
Which of these is true?
(a) (i) is a postulate and (ii) is a theorem. (b) (i) is a theorem and (ii) is a postulate.
(c) Both (i) and (ii) are theorems. (d) Both (i) and (ii) are postulates.
Ans. (a) (i) is a postulate and (ii) is a theorem.

2. Euclid divided his famous treatise 'The elements' into:
(a) 13 chapters (b) 12 chapters (c) 11 chapters (d) 9 chapters
Ans. (a) 13 chapters

3. Observe the figure shown.



A student claimed that the lines when extended meet at a point which lies on the left of the line c. Given that the student's claim is true, which of these justifies the claim?
(a) $p + q < 180°$ (b) $p + r < 180°$ (c) $r + s < 180°$ (d) $s + q < 180°$
Ans. (c) $r + s < 180°$

4. Two quantities P and Q are such that P = Q. Which of these equations illustrates the Euclid's axiom "If equals are added to equals, the wholes are equals"?
(a) $P + x = Q - x$ (b) $P + x = Q + x$ (c) $P + x = Q$ (d) $P \times x = Q$
Ans. (b) $P + x = Q + x$

5. 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
Ans. (c) a postulate
"All right angles are equal to each other" is in accordance with Euclid's fourth postulate.

6. Anjali is of the same age as Deepika, Sahasra is also of the same age as Deepika. Which of the following option is correct?
(a) Anjali and Sahasra are of same age.
(b) Anjali is older than Sahasra.
(c) Sahasra is older than Ramanika.
(d) Anjali and Deepika are younger than Sahasra.
Ans. (a) Anjali and Sahasra are of same age.
According to Euclid's Axiom, things which are equal to the same thing are equal to one another.

7. Which of the following statement is false?
(a) A straight line may be drawn from any one point to any other point.
(b) A terminated line cannot be produced indefinitely.
(c) A circle can be drawn with any center and any radius.
(d) All right angles are equals to one another.
Ans. (b) A terminated line cannot be produced indefinitely.
According to Euclid's second postulate, a terminated line can be produced indefinitely.

8. If a straight line falling on two straight lines makes the interior angles on the same side of it, whose sum is 120°, then the two straight lines, if produced indefinitely, meet on the side on which the sum of angles is:
(a) less than 120° (b) greater than 120° (c) equal to 120° (d) greater than 180°
Ans. (c) equal to 120°
If a straight line falling on two straight lines makes the interior angles on the same side of it, whose sum is 120°, then the two straight lines, if produced indefinitely, meet on the side on which the sum of angles is equal to 120°.

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.
(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

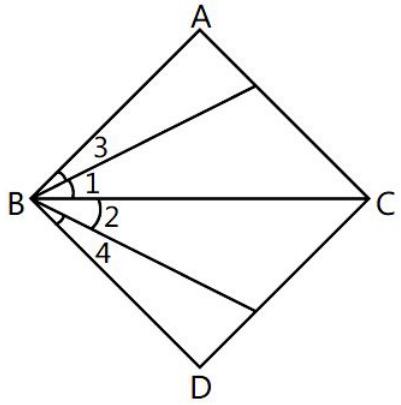
9. **Assertion (A):** If AB = MN and MN = PQ, then AB = PQ.
Reason (R): According to the Euclid's first axiom, 'Things which are equal to the same thing are also equal to one another'.
Ans. (a) Both A and R are true and R is the correct explanation of A.

10. **Assertion (A):** If Rita and Reena are of same age that is 10 years then after 6 years also they will have the same age.
Reason (R): According to Euclid's Axiom, when equals are subtracted from equals, remainders are equal.
Ans. (b) Both A and R are true but R is not the correct explanation of A.

SECTION – B

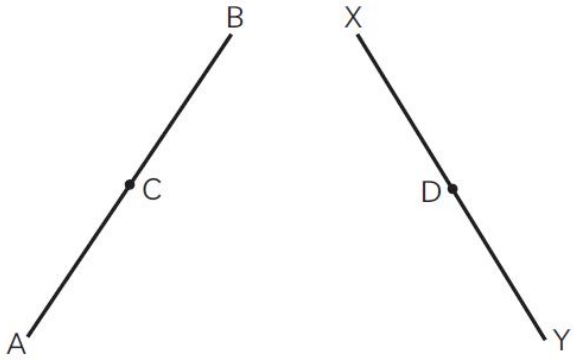
Questions 11 to 14 carry 2 marks each.

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



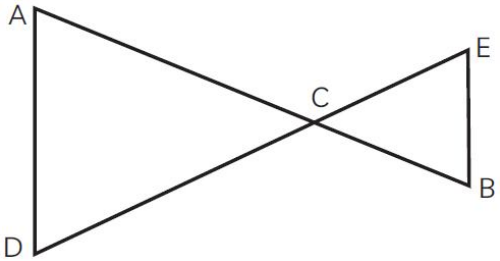
Ans. Given, ∠ 1 = ∠ 2 and ∠ 3 = ∠4.
Using Euclid's second axiom, if equals are added to equals, then the wholes are equal.
Now, ∠ 1 + ∠ 3 = ∠ 2 + ∠4
⇒ ∠ABC = ∠DBC

12. In the figure, we have: AC = XD, C is the midpoint of AB and D is the mid-point of XY. Using an Euclid's axiom, show that AB = XY.



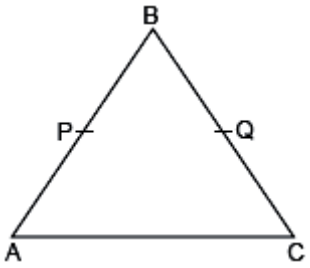
Ans. Given, AC = XD, C is the midpoint of AB and D is the mid-point of XY.
As C is the midpoint of AB,
∴ AB = 2AC
As D is the midpoint of XY,
∴ XY = 2XD
From Euclid's axiom, things that are double of same things are equal to one another
Hence, AB = XY

13. In the given figure AC = DC, CB = CE, then show that AB = DE



Ans. We have AC = DC ...(i) [Given]
And CB = CE ...(ii) [Given]
Now, by axiom 2, if equals are added to equals, the wholes are equal.
Adding eqs. (i) and eqs. (ii).
We get AC + CB = DC + CE
Hence, AB = DE

14. In the given figure, if AB = BC and AP = CQ, then prove that BP = BQ.

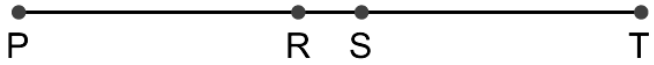


Ans. Given: AB = BC ...(i)
and AP = CQ ...(ii)
According to Euclid's axiom, if equals are subtracted from equals, the remainders are equal.
Therefore, on subtracting (ii) from (i), we get
AB – AP = BC – CQ (Given AP = CQ)
$\Rightarrow$ BP = BQ

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. Prove that every line segment has one and only one mid-point.
Ans. Let us prove this statement by contradiction method. Let us assume that the line segment PT has two midpoints R and S.



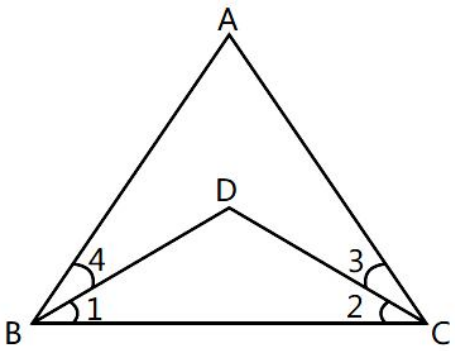
$\Rightarrow$ PR = $\frac{1}{2}$ PT

PS = $\frac{1}{2}$ PT ($\because$ R and S are mid-points according to assumption)

$\Rightarrow$ PR = PS ($\because$ Things which are equal to the same things are equal to one another)
But this is possible only if R and S coincide.
Hence our assumption is wrong. Thus every the segment has one and only one mid point.

16. (a) If x + y = 10, then x + y + z = 10 + z. Euclid's which axiom illustrates this statement?
(b) Solve the equation a – 30 = 40 and state which axiom did you used here.
Ans. (a) Euclid's second axiom; If equals are added to equals, then the wholes are equal (Addition property of equality).
Here, we can see that x + y = 10
Then we are adding an equal quantity, i.e., z to both
x + y + z = 10 + z
(b) a – 30 = 40
$\Rightarrow$ a = 40 + 30 $\Rightarrow$ a = 70
Euclid's second axiom is used here.

17. In the given figure, we have $\angle$ ABC = $\angle$ ACB, $\angle$ 3 = $\angle$ 4. Show that (i) $\angle$ 1 = $\angle$ 2. (ii) BD = DC.

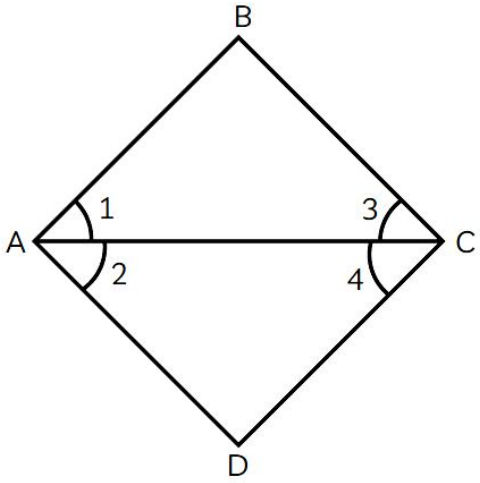


Ans. Given, $\angle 3 = \angle 4$ or $\angle 4 = \angle 3$ ...(1)
and $\angle ABC = \angle ACB$
$\therefore \angle 1 + \angle 4 = \angle 2 + \angle 3$ ...(2)
Using Euclid's third axiom, if equals are subtracted from equals, then remainders are equal.
On subtracting eq. (1) from eq. (2), we get
$\angle 1 + \angle 4 - \angle 4 = \angle 2 + \angle 3 - \angle 3$
$\therefore \angle 1 = \angle 2$
Sides opposite to equal angles are equal.
$\therefore$ BD = DC

SECTION – D

Questions 18 carry 5 marks each.

18. (a) In the figure, we have $\angle 1 = \angle 3$, $\angle 2 = \angle 4$. Show that $\angle A = \angle C$.



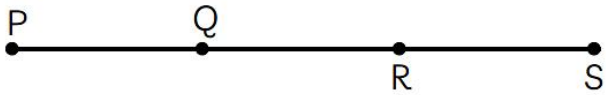
(b) Ritish went Manali with his 2 friends. Ritish and his friend Arun has total 10 shirts where as the number of shirts Arun have is equal to the number of shirts Aditya have. Show that Ritish and Aditya also have total 10 shirts.
Ans. (a) Given, $\angle 1 = \angle 3$, $\angle 2 = \angle 4$
According to the Euclid's second axiom, if equals are added to equals, then the wholes are equal.
Add $\angle 1 = \angle 3$ and $\angle 2 = \angle 4$
$\Rightarrow \angle 1 + \angle 2 = \angle 3 + \angle 4$
$\Rightarrow \angle A = \angle C$
Therefore, $\angle A = \angle C$.
(b) Ritish + Arun = 10 ... (i)
and Arun = Aditya
From Euclid's second axiom, when equals are added to equals, the wholes will be equal.
So, on adding Ritish on both sides of Arun and Aditya we get,
Arun + Ritish = Aditya + Ritish
From eq. (i), 10 = Aditya + Ritish
$\therefore$ Aditya + Ritish = 10

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. 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.

(a) In this process, which axiom is used. Also write their statement.
(b) If Deepak contributed ₹30,000, then how much contribute the Rohit?
(c) In the given figure, if PR = QS, then prove that PQ = RS.



Ans. (a) In this process, Axiom 1 is used i.e., things which are equal to the same things are equal to the one another.
(b) We have, Deepak and Rohit distribute equal amounts.
Since, Deepak contributes ₹30,000, so Rohit also contribute ₹30,000.
(c) It is given, PR = QS
From the given figure, we get,
PR = PQ + QR
and QS = QR + RS
∴ PQ + QR = QR + RS ...(i)
[Given: PR = QS]
Subtract QR from both sides of the equation (i), we get,
PQ + QR – QR = QR + RS – QR
PQ = RS

20. 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.

(a) It is known that a + b = 20 and a = c. Show that c + b = 20.
(b) How many stamps remain with each store after Rahul's purchase?
(c) Solve the equation y + 12 = 15 and state the Euclid axiom used here.
Ans. (a) According to the question, We have, a + b = 10 ...(i)

and a = c ...(ii)
Applying Euclid's axiom, if equals are added to equals, the whole are equal. We get,
From eqs. (i) and (ii)
a + b = c + b ...(iii)
From eqs. (i) and (iii), c + b = 10
(b) Let, each store have x stamps. Now, after Rahul bought 3 stamps, store left with (x – 3) stamps.
(c) y + 12 – 12 = 15 – 12
⇒ y = 15 – 12
⇒ y = 3.
It is stated in Euclid's Third axiom.