SAMPLE PAPER_200224

PRACTICE PAPER 07 - CHAPTER 06, 07 & 08 (2023-24)

(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.

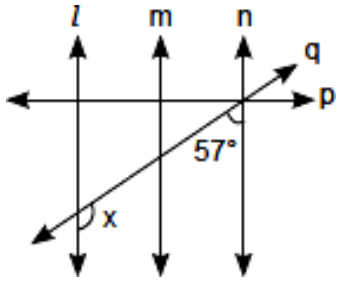
(iv). There is no overall choice.

(v). Use of Calculators is not permitted

SECTION – A

Questions 1 to 10 carry 1 mark each.

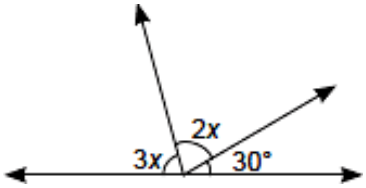
1. In the given figure, line l || line m || line n, line p and line q are transversals . Then , measurement of ∠ x is



(a) 57° b) 43° (c) 150° (d) 123°

Ans: (d) 123°

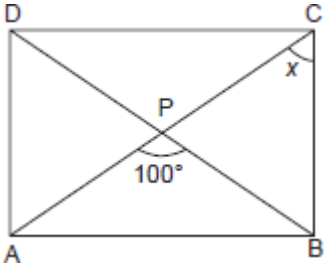
2. In the given figure, the value of x is



(a) 20° (b) 30° (c) 40° (d) 50°

Ans: (b) 30°

3. In the given figure, ABCD is a rectangle in which ∠APB = 100°. The value of x is



(a) 40° (b) 50° (c) 60° (d) 70°

Ans: (b) 50°

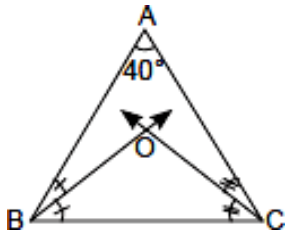
Diagonals of rectangle are equal to each other.

∴ AC = BD ⇒ ½AC = ½BD ⇒PC = PB

⇒ ∠PCB = ∠PBC = x

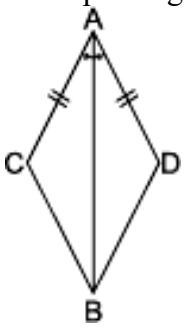
⇒ x + x =100º (Exterior angle property of triangle PBC)
⇒ 2x = 100º ⇒ x = 50º

4. In the given figure, measure of ∠BOC is



(a) 110° (b) 40° (c) 70° (d) 60°
Ans: (a) 110°

5. In the given figure, the congruency rule used in proving ΔACB ≅ ΔADB is



(a) ASA (b) SAS (c) AAS (d) none of these
Ans: (b) SAS

6. Given two right-angled triangles ABC and PRQ, such that ∠A = 30°, ∠Q = 30° and AC = QP. Write the correspondence if triangles are congruent.
(a) ΔABC ≅ ΔPQR (b) ΔABC ≅ ΔPRQ (c) ΔABC ≅ ΔRQP (d) ΔABC ≅ ΔQRP
Ans: (d) ΔABC ≅ ΔQRP

7. In a quadrilateral ABCD, equal diagonals AC and BD intersect at P, such that AP = PC and BP = PD, also ∠BPC = 90°, then quadrilateral is exactly
(a) a parallelogram (b) a square (c) a rhombus (d) a rectangle
Ans: (b) a square

8. It is given that ΔABC ≅ ΔFDE and AB = 5 cm, ∠B = 40° and ∠A = 80°. Then which of the following is true?
(a) DF = 5 cm, ∠F = 60° (b) DF = 5 cm, ∠E = 60°
(c) DE = 5 cm, ∠E = 60° (d) DE = 5 cm, ∠D = 40°
Ans: (b) DF = 5 cm, ∠E = 60°

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.

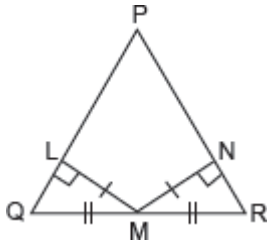
9. **Assertion (A):** An angle is 14^0 more than its complementary angle, then angle is 52^0.
Reason (R): Two angles are said to be complementary if their sum of measure of angles is 180^0.
Ans: (a) Both A and R are true and R is the correct explanation of A.

10. Assertion (A): In ΔABC, ∠C = ∠A, BC = 4 cm and AC = 5 cm. Then, AB = 4 cm
Reason (R): In a triangle, sides opposite to two equal angles are equal.
Ans: (a) Both A and R are true and R is the correct explanation of A.

SECTION – B

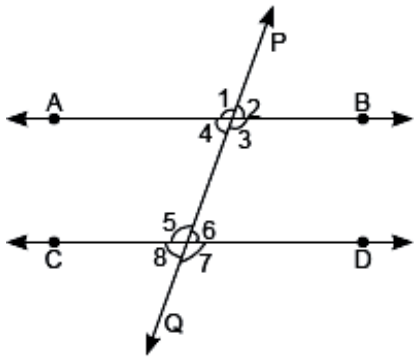
Questions 11 to 14 carry 2 marks each.

11. In the given figure, LM = MN, QM = MR, ML ⊥ PQ and MN ⊥ PR. Prove that PQ = PR.



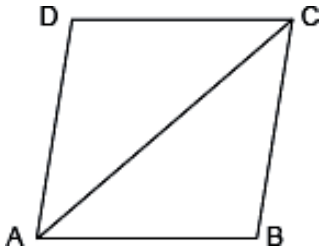
Ans: Given: LM = MN, QM = MR
ML ⊥ PQ and MN ⊥ PR
In ΔQML and ΔRMN, LM = MN (Given)
∠L = ∠N (Each 90°)
QM = MR (Given)
⇒ ΔQML ≅ ΔRMN (RHS congruence rule)
⇒ ∠LQM = ∠NRM (CPCT)
⇒ PQ = PR (Sides opposite to equal angles are equal)

12. In the given figure, AB || CD, $\angle 1 = 90° + x$ and $\angle 7 = 4x$. Find the measure of $\angle 1$ and $\angle 2$.



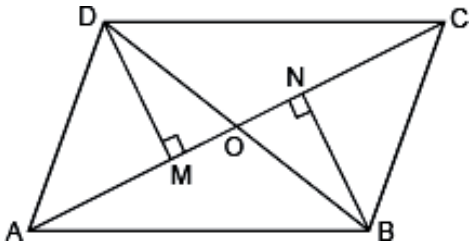
Ans: Given AB || CD,
⇒ ∠1 = ∠7 (Alternate exterior angles)
⇒ $90° + x = 4x$ ($\angle 1 = 120 + x$)
⇒ $90° = 4x - x = 3x$
⇒ $x = 90°/3 = 30°$
∴ $\angle 1 = 90° + x = 90° + 30° = 120°$
and $\angle 1 + \angle 2 = 180°$ (linear pair)
⇒ $\angle 2 = 180° - 120° = 60°$

13. Prove that a diagonal of a parallelogram divides it into two congruent triangles.
Ans:
Given: ABCD is a parallelogram.
To prove: ΔABC ≅ ΔADC



Proof: In ΔABC and ΔADC,
$AB = DC$ (Opposite sides of parallelogram)
$BC = AD$ (Opposite sides of parallelogram)
$AC = AC$ (Common)
$\therefore \Delta ABC \cong \Delta ADC$ (SSS congruence rule)
$\therefore$ Diagonal AC divides parallelogram ABCD into two congruent triangles ABC and CDA.

14. In quadrilateral ABCD, BN and DM are drawn perpendicular to AC. Such that BN = DM. Prove that O is mid-point of BD.

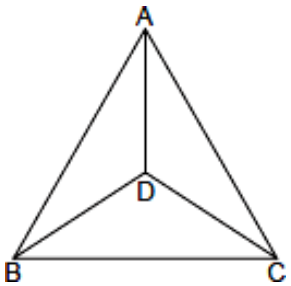


Ans: In ΔDMO and ΔBNO,
$\angle DMO = \angle BNO = 90°$ (Given)
$\angle DOM = \angle BON$ (Vertically opposite angles)
$DM = BN$ (Given)
$\therefore \Delta DMO \cong \Delta BNO$ (AAS congruence rule)
$\Rightarrow$ DO = BO (CPCT)
$\Rightarrow$ O is mid-point of BD Hence proved

SECTION – C

Questions 15 to 17 carry 3 marks each.

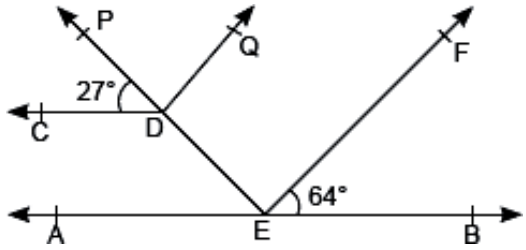
15. In the given figure, AB = AC and D is a point in the interior of ΔABC such that $\angle DBC = \angle DCB$. Prove that AD bisects $\angle BAC$ of ΔABC.



Ans: In ΔBDC,
$\angle DBC = \angle DCB$ (Given)
$\Rightarrow BD = CD$ (Sides opposite to equal angles are equal)
Now, in ΔABD and ΔACD,
AB = AC (Given)
BD = CD (Proved above)
and AD = AD (Common)
$\Rightarrow \Delta ABD \cong \Delta ACD$ (SSS congruence rule)

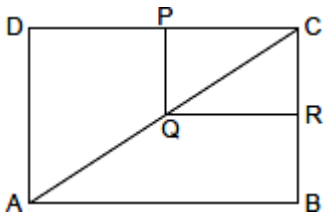
$\therefore \angle BAD = \angle CAD$ (CPCT)
Hence, AD bisects $\angle BAC$. Hence Proved.

16. In the given figure, EF || DQ and AB || CD. If $\angle FEB = 64°$, $\angle PDC = 27°$, then find $\angle PDQ$, $\angle AED$ and $\angle DEF$.

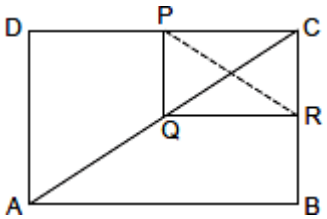


Ans: Given: EF || DQ and AB || CD
Now $\angle AED = \angle CDP$ (Corresponding angles)
$\Rightarrow \angle AED = 27°$ (Given that $\angle CDP = 27°$)
Also, $\angle AED + \angle DEF + \angle FEB = 180°$ (Linear pair axiom)
$\Rightarrow 27° + \angle DEF + 64° = 180°$
$\Rightarrow \angle DEF = 180° - 91° = 89°$
Now, DQ || EF (Given)
PE is transversal
$\therefore \angle PDQ = \angle DEF$ (Corresponding angles)
$\Rightarrow \angle PDQ = 89°$

17. In the given figure, ABCD and PQRC are rectangles and Q is the mid-point of AC. Prove that:
(i) DP = PC (ii) PR = $\frac{1}{2}$ AC



Ans: Given: ABCD and PQRC are two rectangles and Q is the mid-point of AC.



(i) In ΔACD,
Q is the mid-point of AC
$\angle ADC = \angle QPC = 90°$ (Each angle of rectangle is right angle)
But these are corresponding angles.
$\Rightarrow$ PQ | | DA
$\therefore$ P is the mid-point of CD.
i.e. DP = PC
(ii) We have QC = PR (Diagonals of rectangle are equal)

and QC = $\frac{1}{2}$ AC (Given)

$\therefore$ PR = $\frac{1}{2}$ AC Hence proved.

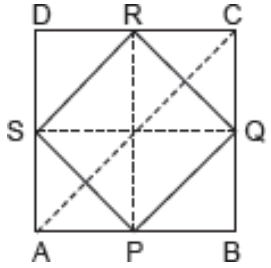
SECTION – D

Questions 18 carry 5 marks.

18. Show that the quadrilateral formed by joining the mid-points of the sides of a square, is also a square.

Ans:

ABCD is a square. P, Q, R and S are the mid-points of sides AB, BC, CD and DA respectively.



Join AC, PR and SQ.

In ΔABC,

P and Q are mid-points of side AB and BC respectively.

$\therefore$ PQ || AC and PQ = $\frac{1}{2}$ AC ...(i) (By mid-point theorem)

Similarly, in ΔADC,

S and R are mid-points of sides AD and DC respectively.

$\therefore$ RS || AC and RS = $\frac{1}{2}$ AC ...(ii) (By mid-point theorem)

From (i) and (ii), we get

PQ || RS

PQ = RS

Similarly, we can prove that RQ || PS and PS = RQ

$\Rightarrow$ PQRS is a parallelogram .....(iii)

In ΔPBQ and ΔQCR

BQ = QC (Q is mid-point of BC)

$\angle$B = $\angle$C = 90° (Each angle of square is 90°)

BP = CR (Halves of equal sides of square)

$\Rightarrow$ ΔPBQ $\cong$ ΔQCR (SAS congruence rule)

$\Rightarrow$ PQ = QR (CPCT) ...(iv)

From (iii) and (iv), we get

PQRS is a rhombus (If adjacent sides of parallelogram are equal, then it is a rhombus) ...(v)

Also, PBCR is a rectangle. (As CR || PB, CR = PB and $\angle$B = $\angle$C = 90°)

$\Rightarrow$ PR = BC

Similarly, DCQS is a rectangle. (As CQ || DS, CQ = DS and $\angle$C = $\angle$D = 90°)

$\therefore$ CD = QS

Now, BC and CD are equal (Equal sides of square)

$\Rightarrow$ PR = QS

But these are diagonals of rhombus PQRS.

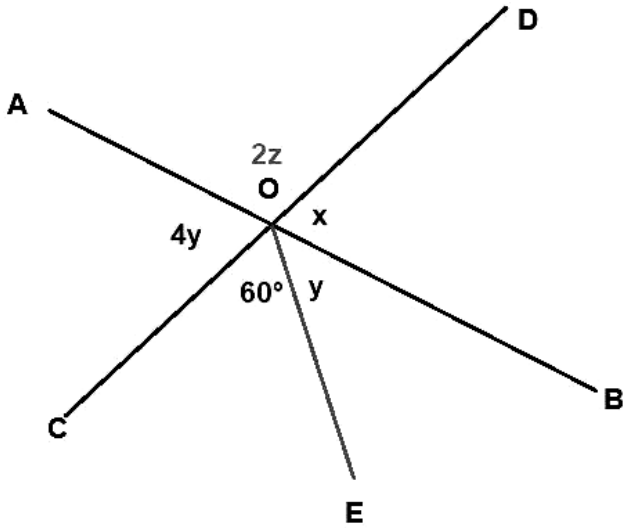
If diagonals of rhombus are equal, then it is a square.

$\Rightarrow$ PQRS is a square.

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Maths teacher draws a straight line AB shown on the blackboard as per the following figure. Now he told Mohan to draw another line CD as in the figure. The teacher told Ajay to mark ∠AOD as 2z. Aditya was told to mark ∠AOC as 4y then Ravi Made and angle ∠COE = 60°. Lastly again Ajay marked ∠BOE and ∠BOD as y and x respectively



Answer the following questions:

(i) What is the value of x?

(ii) What is the value of y?

(iii) What is the value of z?

(iv) What should be the value of x + 2z?

Ans:

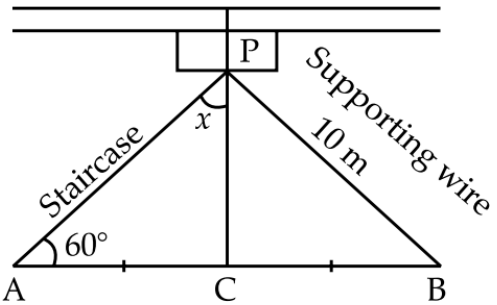
(i) $x = 96^0$

(ii) $y = 24^0$

(iii) $z = 42^0$

(iv) $x + 2z = 180^0$

20. Aditya went to village in summer vacation. He saw a big pole PC while playing. This pole was tied with a strong wire of 10 m length. Once there was a big spark on this pole, thus wires got damaged very badly. Any small fault was usually repaired with the help of a rope which normal board electricians were carrying on bicycles. This time electricians need a staircase of 10 m, so that it can reach at point P on the pole and this should make 60° with line AC.



(i) In ΔPAC and ΔPBC which side is common? (1)

(ii) In figure, ΔPAC and ΔPBC are congruent due to which criterion? (2)

OR

Find the value of ∠x? (2)

(iii) Find the measure of ∠PBA? (1)

Ans: (i) As shown in figure side PC is common.

(ii) In ΔPAC and ΔPBC

PC = PC (Common)
$\angle PCA = \angle PCB = 90°$
AP = BP = 10 m (given) ($\because$ Length of Rope = Length of Stairs case)
$\therefore \Delta PAC \cong \Delta PBC$ (By RHS)
Hence, ΔPAC and ΔPBC are congruent due to 'RHS' criterion.
OR
In ΔPAC, $\angle A = 60°$, $\angle PCA = 90°$ (given)
$\angle APC + \angle PAC + \angle PCA = 180°$ (Angle sum property)
$\Rightarrow x + 60° + 90° = 180°$
$\Rightarrow x = 30°$
(iii) In ΔPAB, PA = PB (given)
$\Rightarrow \angle PAB = \angle PBA = 60°$ (Angles opposite to equal sides are equal)