DIKSHA COACHING CLASSES

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MOST IMPORTANT QUESTIONS

CHAPTER 1 SIMILARITY

PREVIOUS YEAR QUESTIONS (2019, 2020, 2021, 2022,2023)

Chapter Weightage: 10 Marks

Q.1) A. MCQs [each 1 mark]

1) $\Delta ABC \sim \Delta PQR$; if $AB = 4cm$, $PQ = 6cm$ and $QR = 9cm$, then $BC =$ ____ **[Sept 2021]**
(A) 7 cm (B) 6cm (C) 8 cm (D) 9 cm

2) ΔABC and ΔDEF are equilateral triangles. If $A(\Delta ABC) : A(\Delta DEF) = 1:2$ and $AB = 4$, then what is the length of DE? **[March 2019]**
(A) $2\sqrt{2}$ (B) 4 (C) 8 (D) $4\sqrt{2}$

3) $\Delta ABC \sim \Delta PQR$ and $\angle A = 45°$, $\angle Q = 87°$, then $\angle C =$ ______. **[Nov 2020]**
(A) 45° (B) 87° (C) 48° (D) 90°

4) If $\Delta\ ABC \sim \Delta\ PQR$ and $4 \times A\ (\Delta\ ABC) = 25 \times A(\Delta\ PQR)$, then $AB : PQ = ?$ **[July 2019]**
(A) 4: 25 (B) 2:5 (C) 5: 2 (D) 25: 4

5) If $\Delta ABC \sim \Delta DEF$ and $\angle A = 48°$, $\angle D =$ _____, **[March 2022]**
(A) 48° (B) 83° (C) 49° (D) 132°

6) $\Delta PQR \sim \Delta STU$ and $A(\Delta PQR) : A(\Delta STU) = 64:81$, then what is the ratio of corresponding sides? **[Aug 2022]**
(A)8 : 9 (B) 64 : 81 (C) 9 : 8 (D) 16 : 27

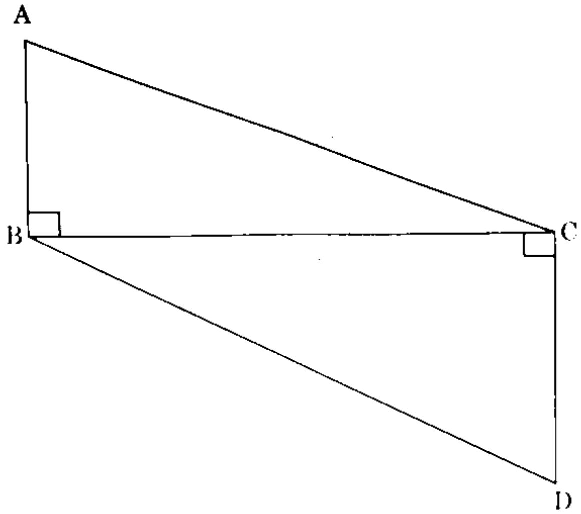
Q.1) B. Solve [each 1 mark]

1) If $\Delta ABC \sim \Delta PQR$ and $\angle A = 60°$, then $\angle P = ?$ **[March 2019]**

2) The ratio of corresponding sides of similar triangles is 3:5, then find the ratio of their areas. **[March 2020]**

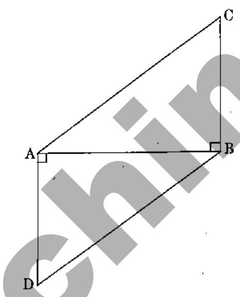
3) In the figure,
$seg\ AB \perp seg\ BC$,
$seg\ DC \perp seg\ BC$,
If AB= 3 and DC= 4, then
find $\frac{A(\Delta ABC)}{A(\Delta DCB)}$ =?

[Sept 2021] & [Nov 2020]



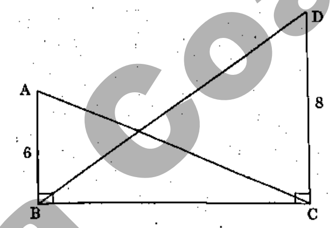
4) In the above figure, $seg\ CB \perp seg\ AB, seg\ AD \perp segAB$. If $BC = 4, AD = 8$, then find $\frac{A(\Delta ABC)}{A(\Delta ADB)}$.

[Aug 2022]



5) In the following figure, $\angle ABC = \angle DCB = 90°$, If $AB = 6, DC = 8$, then find $\frac{A(\Delta ABC)}{A(\Delta DCB)}$ =?

[July 2023]

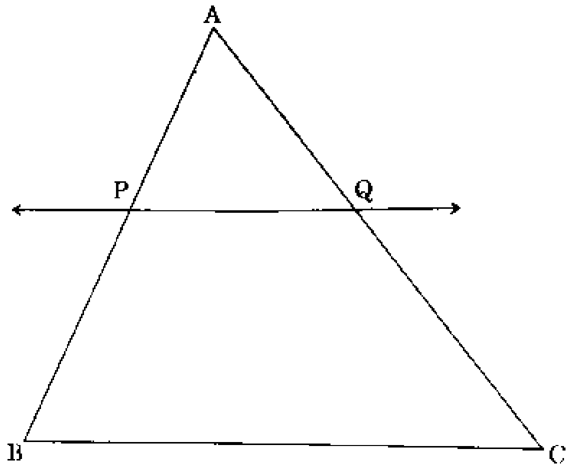


6) If $\Delta ABC \sim \Delta PQR$ and $\frac{A(\Delta ABC)}{A(\Delta PQR)} = \frac{16}{25}$, then find $AB:PQ$.

[March 2023]

Q.2) A. Activity [each 2 marks]

1) [Sept 2021]



In Δ ABC, line PQ || side BC. If AP = 10, PB = 12, AQ = 15,

then complete the following activity to find the value of QC.

Activity : In Δ ABC, line PQ || side BC ...... (given)

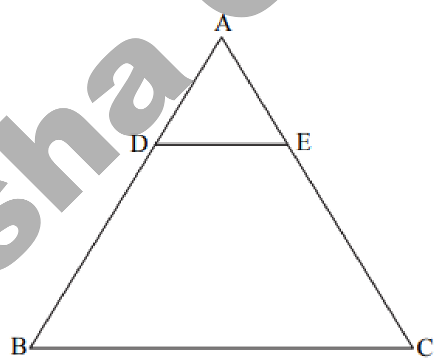
$\therefore \quad \frac{AP}{PB} = \frac{AQ}{QC}$ .... $\boxed{}$

$\therefore \quad \frac{10}{12} = \frac{\boxed{}}{QC}$

$\therefore \quad QC = \frac{\boxed{} \times 12}{10}$

$\therefore \quad QC = \boxed{}$

2) [March 2020] [Nov 2020]



In ΔABC, seg DE || side BC. If AD = 6 cm, DB = 9 cm, EC = 7.5 cm, then complete the following activity to find AE.

Activity: In ΔABC, seg DE || side BC ..... (given)

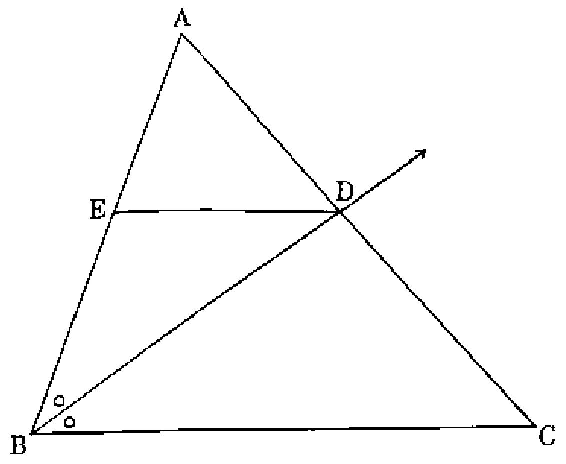
$\therefore \quad \frac{AD}{DB} = \frac{AE}{EC}$ .... $\boxed{}$

$\therefore \quad \frac{6}{9} = \frac{AE}{\boxed{}}$

$\therefore \quad AE = \frac{6 \times 7.5}{\boxed{}}$

$\therefore \quad AE = \boxed{}$

3) [March 2019]



In Δ ABC, ray BD bisects $\angle ABC$.

If A–D–C, A–E–B and seg ED $\parallel$ side BC, then prove that :

$$\frac{AB}{BC} = \frac{AE}{EB}$$

Proof :

In Δ ABC, ray BD is bisector of $\angle ABC$.

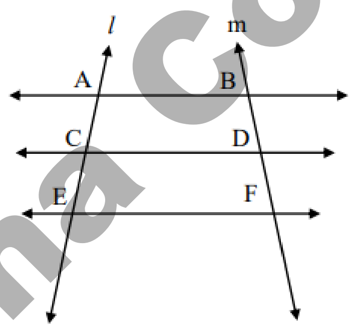
$\therefore \quad \frac{AB}{BC} = \boxed{\frac{\dots\dots}{\dots\dots}}$ (I) (By angle bisector theorem)

In Δ ABC, seg DE $\parallel$ side BC

$\therefore \quad \frac{AE}{EB} = \frac{AD}{DC}$ (II) $\boxed{}$

$\therefore \quad \frac{AB}{\square} = \frac{\square}{EB}$ .... (From I and II)

4) [July 2019]



In the above figure, line AB $\parallel$ line CD $\parallel$ line EF , line l and line m are its transversals. If AC = 6, CE = 9. BD = 8, then complete the following activity to find DF.

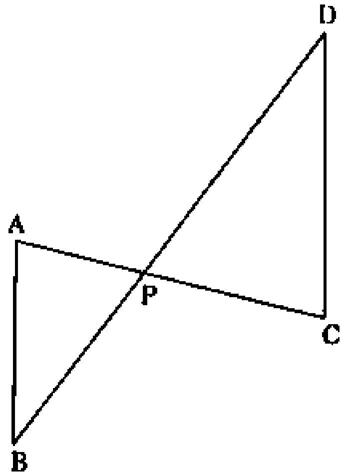
Activity:

$\frac{AC}{\square} = \frac{\square}{DF}$ (Property of three parallel lines and their transversal)

$\frac{6}{9} = \frac{\square}{DF}$

DF = $\square$

5) [March 2022]



In the above figure, seg AC and seg BD intersect each other in point P. If $\frac{AP}{CP} = \frac{BP}{DP}$, then complete the following activity to prove Δ ABP ~ Δ CDP.

Activity : In Δ APB and Δ CDP

$\frac{AP}{CP} = \frac{BP}{DP}$ .... $\boxed{}$

$\therefore$ $\angle APB \cong \boxed{}$ .... vertically opposite angles

$\therefore$ $\boxed{} \sim \Delta CDP$ .... $\boxed{}$ test of similarity.

6) In ΔPQR, if $PN = 12, NR = 15, MQ = 10$, then complete the following activity to justify whether seg NM is parallel to side RQ or not. [Aug 2022]

Activity : In ΔPQR,

$\frac{PN}{NR} = \frac{12}{\boxed{}} = \frac{3}{2}$ .... (I)

and $\frac{PM}{MQ} = \frac{15}{12} = \frac{\boxed{}}{4}$ .... (II)

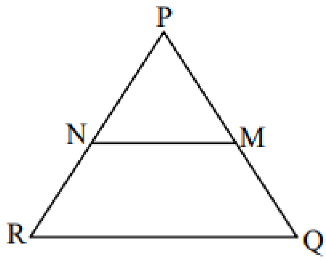
$\therefore$ $\frac{PN}{NR} \neq \frac{PM}{MQ}$ .... from (I) and (II)

$\therefore$ By $\boxed{}$

seg NM is $\boxed{}$ to side RQ.

Q.2) B. **Solve [each 2 marks]**

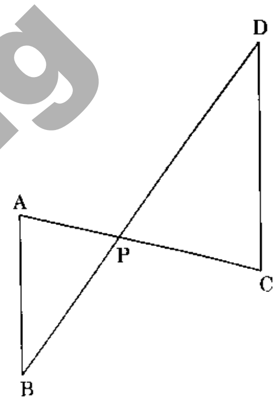
1) In $\Delta PQR, NM \parallel RQ$. If PM=15, $MQ = 10, NR = 8, then\ find\ PN$. **[March 2020]**



2) If $\Delta ABC \sim \Delta DEF$, then write the corresponding congruent angles and also write the ratio of corresponding sides. **[July 2019]**

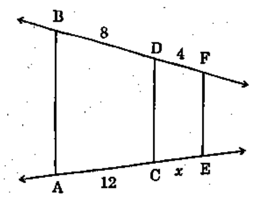
3) $\Delta ABC \sim \Delta PQR$, A(ΔABC) = 81 cm^2 , A(ΔPQR) = 121 cm^2 . If BC = 6.3 cm, then find QR. **[Nov 2020]**

4) In the above figure, seg AC and seg BD intersect each other in point P and $\frac{AP}{CP} = \frac{BP}{DP}$, $then\ prove\ that$: $\Delta ABP \sim \Delta CDP$ **[Sept 2021]**

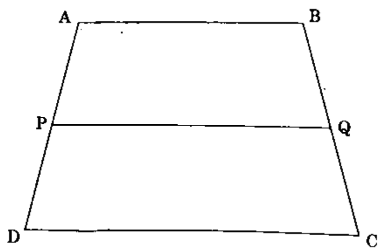


5) If $\Delta ABC \sim \Delta PQR$, $AB : PQ = 4 : 5$ and $A(\Delta PQR) = 125\ cm^2$, then find A(ΔABC) **[March 2022]**

6) In the above figure, if $AB \| CD \| EF$, then find x and AE by using given information. **[July 2023]**



7) In trapezium ABCD side AB || side PQ || side DC. AP = 15, PD = 12, QC = 14, find BQ. **[March 2023]**



Q.3) A. **Activity [each 3 marks]**

1) If Δ ABC ~ Δ PQR, A(Δ ABC) = 81 cm^2, A(Δ PQR) = 121 cm^2, BC = 6.3 cm, then complete the following activity to find QR. [Sept 2021]

Activity :

Δ ABC ~ Δ PQR .... (given)

$\therefore \quad \dfrac{A(\Delta ABC)}{A(\Delta PQR)} = \dfrac{\boxed{}}{QR^2}$ .... $\boxed{}$

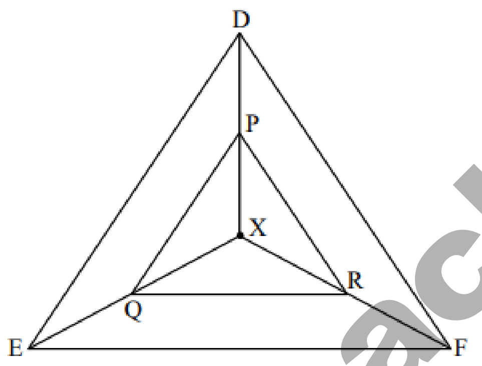
$\therefore \quad \dfrac{\boxed{}}{121} = \dfrac{(6.3)^2}{QR^2}$

$\therefore \quad \dfrac{\boxed{}}{11} = \dfrac{6.3}{QR}$ .... (Taking square root of both sides)

$\therefore \quad QR = \dfrac{6.3 \times 11}{\boxed{}}$

$\therefore \quad QR = \boxed{}$ cm

2) [March 2020] [March 2023]



In the given figure, X is any point in the interior of the triangle. Point X is joined to the vertices of triangle. seg PQ || seg DE, seg QR || seg EF. Complete the activity and prove that seg PR || seg DF.

Proof:

In ΔXDE,

PQ || DE ...(Given)

$\therefore \quad \dfrac{XP}{PD} = \dfrac{\boxed{}}{QE}$ ...(Basic proportionality theorem)...(i)

In ΔXEF,

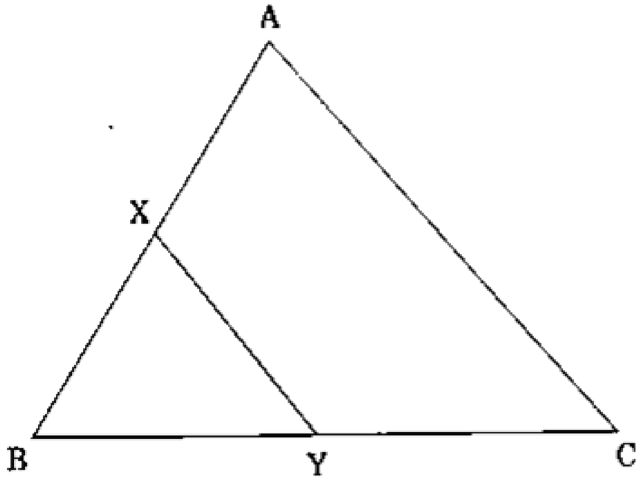
QR || EF ...(Given)

$\therefore \quad \dfrac{XQ}{\boxed{}} = \dfrac{XR}{\boxed{}}$ ...($\boxed{}$)...(ii)

$\therefore \quad \dfrac{XP}{PD} = \boxed{\dfrac{}{}}$ ...[From (i) and (ii)]

$\therefore$ seg PR || seg DF ...(By converse of basic proportionality theorem)

3) [Aug 2022]



In the above figure, in ΔABC

seg $XY \parallel$ side AC, A-X-B, B-Y-C

If $2AX = 3BX$ and $XY = 9$, then complete the following activity to find the value of AC.

Activity :

$\therefore$ $2AX = 3BX$ .... given

$\therefore$ $\dfrac{AX}{BX} = \dfrac{\boxed{}}{\boxed{}}$

$\therefore$ $\dfrac{AX + BX}{BX} = \dfrac{3+2}{2}$ .... componendo

$\therefore$ $\dfrac{AB}{BX} = \dfrac{5}{2}$ .... (I)

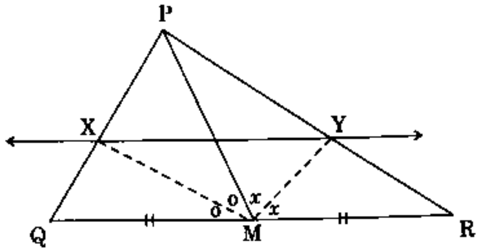
$\Delta BCA \sim \Delta BYX$ .... $\boxed{}$ test of similarity

$\therefore$ $\dfrac{BA}{BX} = \dfrac{AC}{\boxed{}}$ .... c.s.s.t.

$\therefore$ $\dfrac{5}{2} = \dfrac{AC}{\boxed{}}$ .... from (I)

$\therefore$ $AC = \boxed{}$

4) [March 2023]



In Δ PQR, seg PM is a median. Angle bisectors of $\angle$PMQ and $\angle$PMR intersect side PQ and side PR in points X and Y respectively. Prove that XY $\parallel$ QR.

Complete the proof by filling in the boxes.

Solution :

In Δ PMQ,

Ray MX is the bisector of $\angle$PMQ

$\therefore \frac{MP}{MQ} = \frac{\boxed{}}{\boxed{}}$ .... (I) [Theorem of angle bisector]

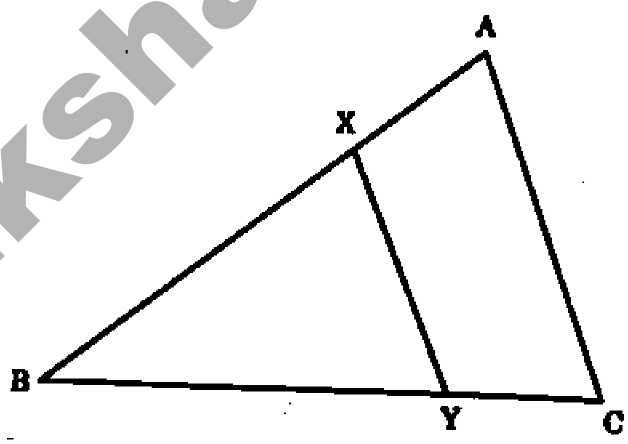
Similarly, in Δ PMR, Ray MY is bisector of $\angle$PMR

$\therefore \frac{MP}{MR} = \frac{\boxed{}}{\boxed{}}$ .... (II) [Theorem of angle bisector]

Q.3) B. Solve the following [each 3 marks]

1) Prove that, "The ratio of the intercepts made on a transversal by three parallel lines is equal to the ratio of the corresponding intercepts made on any other transversal by the same parallel lines." [Nov 2020]

2)



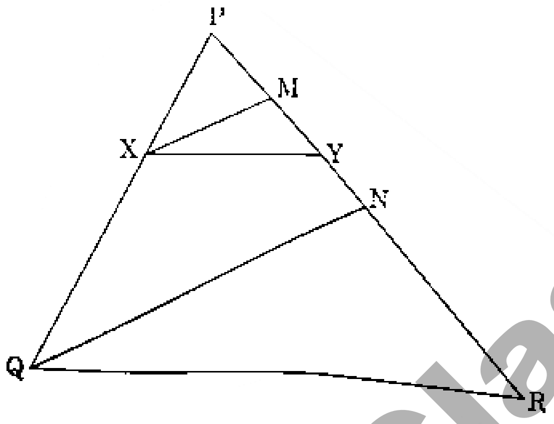
In ΔABC, seg XY || side AC. If $2AX = 3BX$ and XY=9, then find the value of AC. [March 2022]

Q.4) **Solve [each 4 marks]**

1) In ΔPQR, $seg\ XY \parallel side\ QR$, point M and point N are midpoints of seg PY and seg PR respectively, then prove that: **[Sept 2021]**

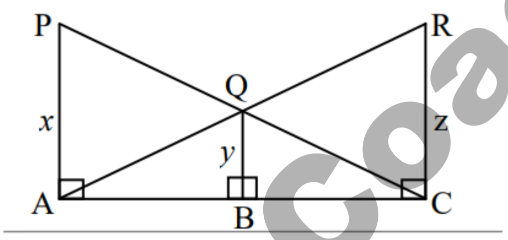
$(a)\ \Delta PXM \sim \Delta PQN$

$(b)\ seg\ XM\ \parallel seg\ QN$



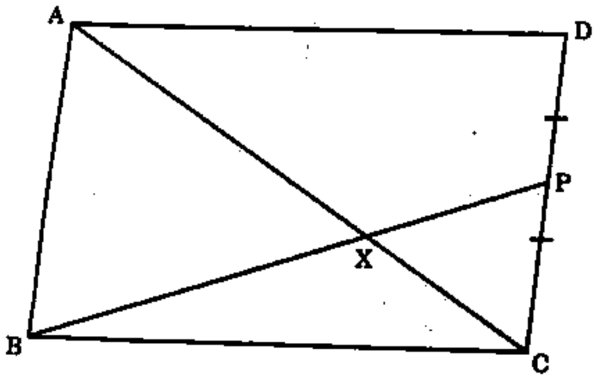
2) In ΔABC, PQ is a line segment intersecting AB at P and AC at Q such that seg PQ || seg BC. If PQ divides ΔABC into two equal parts having equal areas, find $\frac{BP}{AB}$ **[March 2020]**

3) **[July 2019]**



In the above figure, seg PA, seg QB and RC are perpendicular to seg AC. From the information given in the figure, prove that: $\frac{1}{x} + \frac{1}{z} = \frac{1}{y}$.

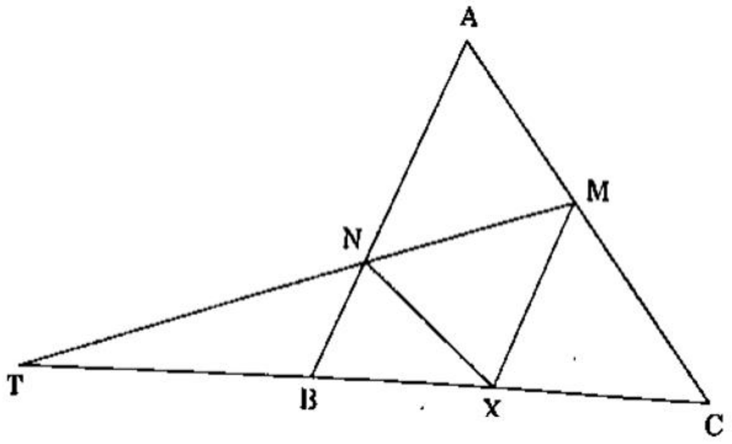
4) [Aug 2022]



$\square ABCD$ is parallelogram. Point P is the midpoint of side CD. Seg BP intersects Diagonal AC at point X, then prove that:

$3AX = 2AC$

5) [Aug 2022]



In ΔABC, point X is any point on seg BC. seg XM || seg AB and seg XN || seg AC. Extend seg MN such that it intersects extended side BC in point T. Then prove that: $TX^2 = TB \times TC$.

6) In ΔABC, seg DE || side BC. If 2A(ΔADE) = A(□ DBCE), find AB:AD and show that BC = $\sqrt{3}$DE. **[March 2023]**

7) In ΔPQR, bisectors of $\angle Q$ and $\angle R$ intersect in point X. Line PX intersects side QR in point Y, then prove that: **[July 2023]**

$$\frac{PQ + PR}{QR} = \frac{PX}{XY}$$

Q.5) Solve [each 3 marks]

1) ΔABC and ΔPQR are equilateral triangles with altitudes $2\sqrt{3}$ and $4\sqrt{3}$ respectively, then : [Aug 2022]

(a) Find the length of side AB and side PQ

(b) Find $\frac{A(\Delta ABC)}{A(\Delta PQR)}$.

(c) Find the ratio of perimeter of ΔABC to the perimeter of ΔPQR.

ALL THE BEST

MOST IMPORTANT QUESTIONS

CHP 2 PYTHAGORAS THEOREM

PREVIOUS YEAR QUESTIONS (2019, 2020, 2021, 2022,2023)

Chapter Weightage: 7 Marks

Q.1) A. MCQ [each 1 mark]

1) In right-angled triangle PQR, if hypotenuse PR = 12 and PQ = 6, then what is the measure of ∠P? **[July 2019]**
(A) 30° (B) 60° (C) 90° (D) 45°

2) Out of the following which is a Pythagorean triplet? **[March 2019]**
(A) (5, 12, 14) (B) (3, 4, 2) (C) (8, 15, 17) (D) (5, 5, 2)

3) Which of the following is not Pythagorean triplet **[Sept 2021]**
(A) (12, 9, 15) (B) (10, 24, 26)
(C) (12,16, 25) (D) (15, 17, 8)

4) Out of the following which is the Pythagorean triplet? **[March 2020]**
(A) (1, 5, 10) (B) (3, 4, 5) (C) (2, 2, 2) (D) (5, 5, 2)

5) In a right-angled triangle, if the sum of the squares of the sides making right angle is 169, then what is the length of hypotenuse? **[Aug 2022]**
(A) 15 (B) 13 (C) 5 (D) 12

6) Find the perimeter of Square if its diagonal is $10\sqrt{2}\,cm$: **[July 2023]**
(A) 10 cm (B) $40\sqrt{2}\,cm$ (C) 20 cm (D) 40 cm

7) If a, b, c are sides of a triangle and $a^2 + b^2 = c^2$, name the type of triangle: **[March 2023]**
(A) Obtuse angle triangle (B) Acute angle triangle
(C) Right angle triangle (D) Equilateral triangle

Q.1) B. Solve [each 1 mark]

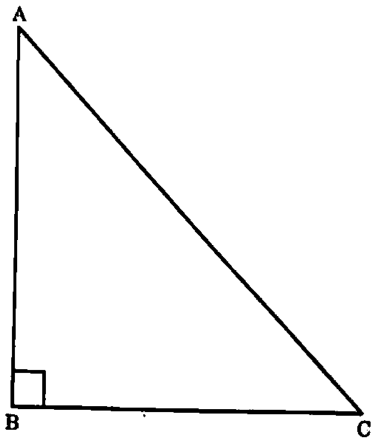
1) In right-angled ΔABC, if ∠B = 90°, AB = 6, BC = 8, then find AC. **[March 2019]**

2) In Δ DEF, if ∠E = 90°, then find the value of ∠D + ∠F. **[July 2019]**

3) Find the diagonal of a square whose side is 10 cm. **[March 2020]**

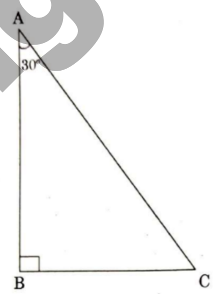
4) Find the side of a square whose diagonal is $12\sqrt{2}$ cm **[Sept 2021]**

5) In $\Delta ABC, \angle ABC = 90°, \angle BAC = \angle BCA = 45°$. If AC= $9\sqrt{2}$, then find the value of AB. **[Mach 2022]**



[Aug 2022]

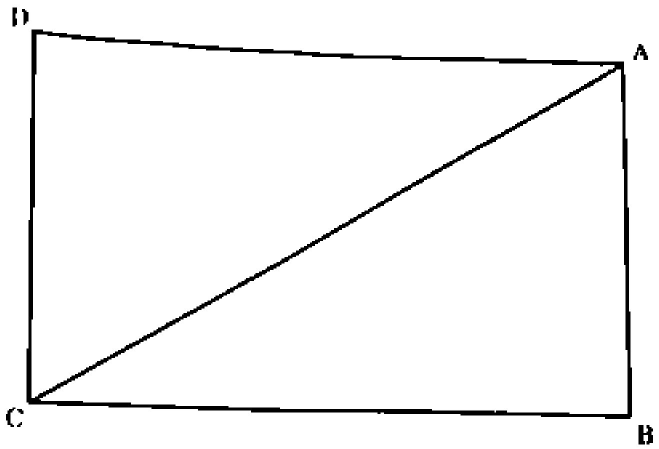
6) In ΔABC, ∠B = 90°, ∠A = 30°, AC = 14, then find BC.



7) In ΔRST, ∠S = 90°, ∠T = 30°, RT = 12 cm, then find RS **[March 2023]**

Q.2) A. **Complete the Activity [each 2 marks]** [March 2022]

1)



In the above figure, $\square$ ABCD is a rectangle. If AB = 5, AC = 13, then complete the following activity to find BC.

Activity :

Δ ABC is $\boxed{}$ triangle.

$\therefore$ By Pythagoras theorem

$AB^2 + BC^2 = AC^2$

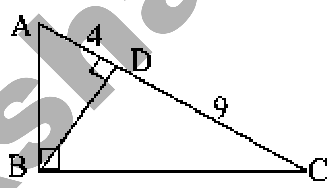
$\therefore \quad 25 + BC^2 = \boxed{}$

$\therefore \quad BC^2 = \boxed{}$

$\therefore \quad BC = \boxed{}$

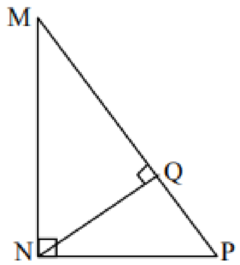
Q.2) B. **Solve [2 marks each]**

1) [March 2019]



In right-angled ΔABC, $BD \perp AC$.
If AD = 4, DC = 9, then find BD.

2) [March 2020]



In ΔMNP, $\angle MNP = 90°$, seg $NQ \perp$ seg MP. If $MQ = 9$, $QP = 4$, then find NQ.

3) In ΔPQR, $\angle P = 60°$, $\angle Q = 90°$ and $QR = 6\sqrt{3}$ cm, then find the values of PR and PQ. [Nov 2020]

4) In $\Delta DEF, \angle E = 90°$. If $DE = 33\ cm, DF = 65\ cm$, then find EF. [Sept 2021]

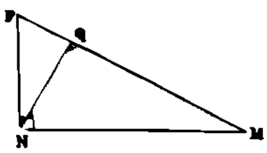
5) In right-angled triangle PQR, if $\angle P = 60°, \angle R = 30°$ and PR=12, then find the values of PQ and QR. [March 2019]

6) Find the side and perimeter of a square whose diagonal is $13\sqrt{2}$ cm. [July 2019]

7) In $\Delta ABC, AB = 9cm, BC = 40cm, AC = 41cm$. State whether ΔABC is a right-angled triangle or not? Write reason. [March 2022]

8) Find the length of diagonal of rectangle having sides 11cm and 60 cm [Aug 2022]

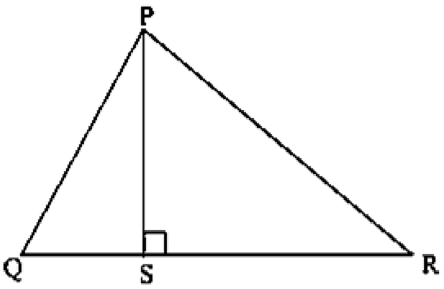
9) In the above figure $\angle MNP = 90°$, seg $NQ \perp seg\ MP$. MQ=9, QP=4. Find NQ [July 2023]



10) Find the length of the diagonal of a rectangle whose length is 35 cm and breadth is 12 cm. [March 2023]

Q.3) A. Activity [3 marks each]

1) [Nov 2020]



In ΔPQR, seg $PS \perp$ side QR, then complete the activity to prove $PQ^2 + RS^2 = PR^2 + QS^2$.

Activity:

In ΔPSQ, $\angle PSQ = 90°$

$\therefore$ $PS^2 + QS^2 = PQ^2$ .... (Pythagoras theorem)

$\therefore$ $PS^2 = PQ^2 - \square$ .... (I)

Similarly,

In ΔPSR, $\angle PSR = 90°$

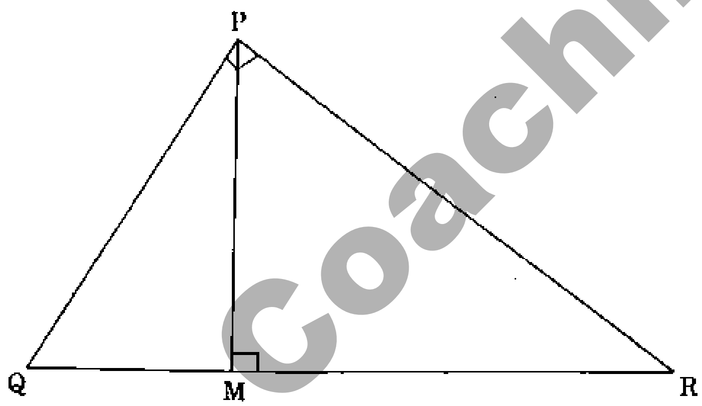
$\therefore$ $PS^2 + \square = PR^2$ .... (Pythagoras theorem)

$\therefore$ $PS^2 = PR^2 - \square$ .... (II)

$\therefore$ $PQ^2 - \square = \square - RS^2$ .... from (I) and (II)

$\therefore$ $PQ^2 + \square = PR^2 + QS^2$

2) [Aug 2022]



In the above figure $\angle QPR = 90°$, seg $PM \perp$ seg QR and Q-M-R $PM = 10$, $QM = 8$, then complete the following activity to find the value of QR.

Activity :

In ΔPQR, $\angle QPR = 90°$ and seg $PM \perp$ seg QR

$\therefore$ $PM^2 = \square \times MR$ .... $\square$

$\therefore$ $(\square)^2 = 8 \times MR$

$\therefore$ $\dfrac{100}{8} = MR$

$\therefore$ $\square = MR$

Now $QR = QM + MR$ .... ($\because$ Q-M-R)

$\therefore$ $QR = 8 + \square$

$\therefore$ $QR = \square$

Q.3) B. Solve [3 marks each]

1) **Prove that**, "In a right-angled triangle, the perpendicular segment to the hypotenuse from the opposite vertex, is the geometric mean of the segments into which the hypotenuse is divided." **[Sept 2021]**

2) In ΔPQR, seg PM is a median, $PM = 9$ and $PQ^2 + PR^2 = 290$. Find the length of QR. **[March 2019]**

3) In Δ ABC, seg AP is a median. If BC = 18, $AB^2 + AC^2 = 260$, then find the length of AP. **[July 2019]**

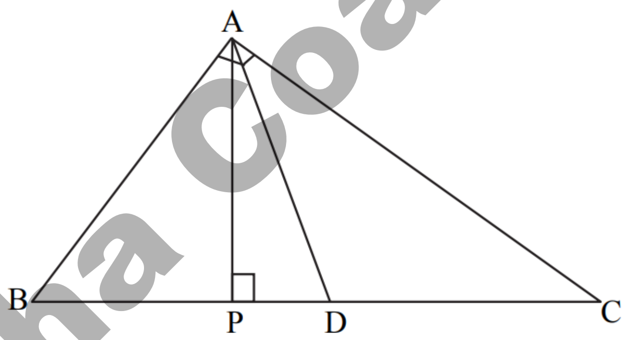
4) If ΔPQR, point S is the mid-point of side QR. If PQ = 11, PR = 17, PS = 13, find QR. **[March 2020]**

5) **Prove that,** "In a right-angled triangle, the square of the hypotenuse is equal is to the sum of the squares of remaining two sides" **[July 2023]**

6) In ΔABC, seg AP is a median. If $BC = 18$, $AB^2 + AC^2 = 260$, Find AP. **[March 2023]**

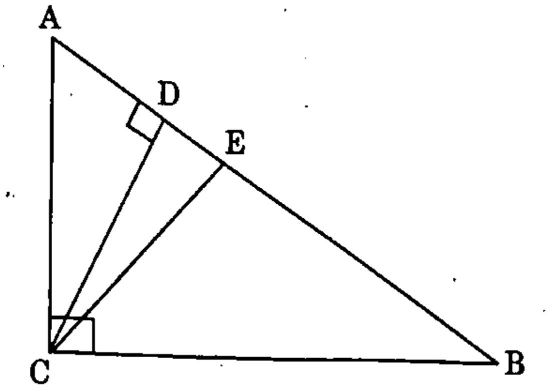
Q.4) Solve the following [each 4 marks]

1) In ΔABC, ∠BAC = 90°, seg AP ⊥ side BC, B-P-C. Point D is the mid-point of side BC, then prove that $2AD^2 = BD^2 + CD^2$



[Nov 2020]

2) [March 2019]



In ΔABC, $\angle ACB = 90°$. Seg CD $\perp$ $side\ AB$ and seg CE is angle bisector of $\angle ACB$.

Prove that: $\frac{AD}{BD} = \frac{AE^2}{BE^2}$

Q.5) **Solve the following [each 3 marks]**

1) If $a\ and\ b$ are natural numbers and $a > b$. If $(a^2 + b^2)$, $(a^2 - b^2)$ and $2ab$ are the sides of the triangle, then prove that the triangle is right angled. Find out two Pythagorean triplets by taking suitable values of $a\ and\ b$. **[March 2022]**

*****ALL THE BEST*****

MOST IMPORTANT QUESTIONS
CHP 3 CIRCLE
PREVIOUS YEAR QUESTIONS (2019, 2020, 2021, 2022, 2023)

Chapter Weightage: 12 Marks

Q.1) A. **MCQs [each 1 mark]**

1) $\angle ACB$ is inscribed in arc ACB of a circle with centre O. If $\angle ACB = 65°$, find m (arc ACB): [March 2019] [July 2023]
(A) 130° (B) 295° (C) 230° (D) 65°

2) If the points, A, B, C are non-collinear points, then how many circles can be drawn which passes through points A, B and C? [July 2019]
(A) two (B) three (C) one (D) infinite

3) Two circles of radii 5.5 cm and 3.3 cm respectively touch each other externally. What is the distance between their centres? [March 2020]
(A) 4.4 cm (B) 2.2 cm (C) 8.8 cm (D) 8.9 cm

4) $\angle PRQ$ is inscribed in the arc PRQ of a circle with centre 'O'. If $\angle PRQ = 75°$, then m(arc PRQ) = ______. [Nov 2020] [Sept 2021]
(A) 75° (B) 150° (C) 285° (D) 210°

5) AP is a tangent at A drawn to the circle with centre O from an external point P. OP=12 cm and $\angle OPA = 30°$, then the radius of a circle is _______. [March 2022]
(A) 12 cm (B) $6\sqrt{3}$cm (C) 6 cm (D) $12\sqrt{3}$ cm

6) Chords AB and CD of a circle intersect inside the circle at point E. If AE = 4, EB = 10, CE = 8, then find ED [March 2023]
(A) 7 (B) 5 (C) 8 (D) 9

Q.1) B. **Solve [each 1 mark]**

1) $\square ABCD$ is cyclic. If $\angle B = 110°$, then find measure of $\angle D$. [March 2020]

2) In cyclic $\square$ABCD, $\angle B = 75°$, then find $\angle D$. [Nov 2020]

3) Radius of the circle with centre C is 6 cm. Line AB is tangent at point A. What is the measure of $\angle CAB$? [Sept 2021]

4) Chord AB and Chord CD of a circle with centre O are congruent. If $m(arc\ AB) = 120°$, then find the $m(arc\ CD)$ [March 2022]

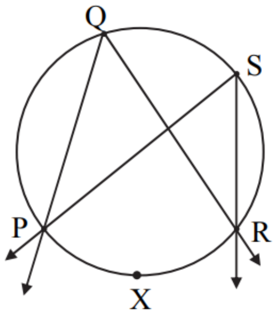
5) Two circles having radii 7 cm and 4 cm touch each other internally. Find the distance between their centres. [Aug 2022]

6) If radius of a circle is 5cm, then find the length of longest chord of a circle. [March 2023]

7) What is the distance between two parallel tangents of a circle having radius 4.5 cm [July 2023]

Q.2) A. **Activity [each 2 marks]**

1) [March 2019]



Prove that, angles inscribed in the same arc are congruent.

Given: $\angle PQR$ and $\angle PSR$ are inscribed in the same arc. Arc PXR is intercepted by the angles.

To prove: $\angle PQR \cong \angle PSR$

Proof:

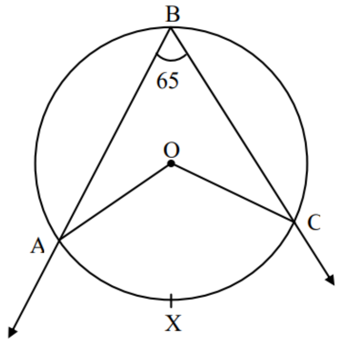
$m\angle PQR = \frac{1}{2} m(\text{arc } PXR)$ ...(i) $\boxed{}$

$m\angle \boxed{} = \frac{1}{2} m(\text{arc } PXR)$ ...(ii) $\boxed{}$

$\therefore$ $m\angle \boxed{} = m\angle PSR$ ...[From (i) and (ii)]

$\therefore$ $\angle PQR \cong \angle PSR$ ...(Angles equal in measure are congruent)

2) In the following figure, O is the centre of the circle. $\angle$ ABC is inscribed in arc ABC and $\angle ABC = 65°$. Complete the following activity to find the measure of $\angle$ AOC. **[July 2019]**



$\angle ABC = \frac{1}{2} m \square$ (Inscribed angle theorem)

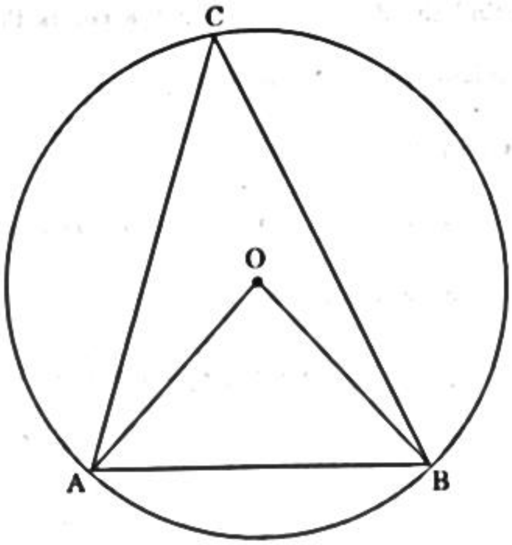
$\square$ **× 2** = m(arc AXC)

m(arc AXC) = $\square$

$\angle AOC$ = m(arc AXC) (Definition of measure of an arc)

$\angle AOC = \square$

3) [Sept 2021]



In the circle with centre O, length of chord AB is equal to radius of the circle. Complete the following activity to find measure of $\angle AOB$ and $\angle ACB$.

Activity :

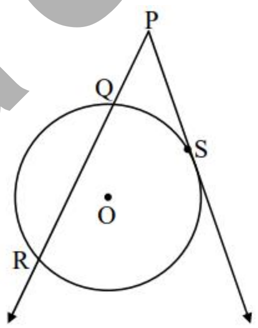
$\angle AOB = \square^\circ$ .... ($\because$ Δ AOB is an equilateral triangle)

$\angle ACB = \frac{1}{2} m(\text{arc } AB)$ .... $\square$

$\therefore \quad \angle ACB = \frac{1}{2} \times \square^\circ$

$\therefore \quad \angle ACB = \square^\circ$

4) [March 2020]



In the figure given above, 'O' is the centre of the circle, seg PS is a tangent segment and S is the point of contact. Line PR is a secant.
If PQ = 3.6, QR = 6.4, find PS.

Solution:

$PS^2 = PQ \times \square$ ...(tangent secant segments theorem)

$= PQ \times (PQ \times \square)$

$= 3.6 \times (3.6 + 6.4)$

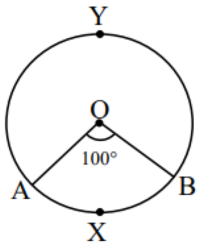
$= 3.6 \times \square$

$= 36$

$\therefore \quad PS = \square$ ...(by taking square roots)

5)

[March 2020]

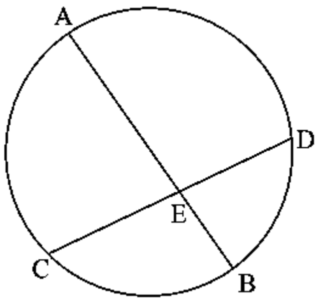


In the figure given above, O is the centre of the circle. Using given information complete the following table:

Type of arc	Name of the arc	Measure of the arc
Minor arc	$\square$	$\square$
Major arc	$\square$	$\square$

6)

[Nov 2020]



In the above figure, chord AB and chord CD intersect each other at point E. If AE = 15, EB = 6, CE = 12, then complete the activity to find ED.

Activity:

Chord AB and chord CD intersect each other at point E …… (given)

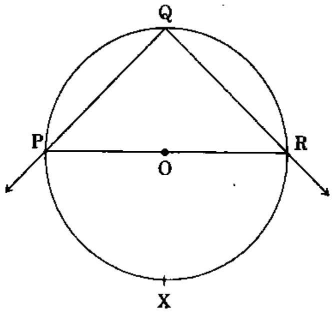
$\therefore$ $CE \times ED = AE \times EB$ ….. $\square$

$\therefore$ $\square \times ED = 15 \times 6$

$\therefore$ $ED = \dfrac{\square}{12}$

$\therefore$ $ED = \square$

7) [Aug 2022]



In the above figure $\angle PQR$ is inscribed in the semicircle PQR, then complete the following activity to find measure of $\angle PQR$.

Activity :

m(arc PQR) = 180° .... (measure of semicircle)

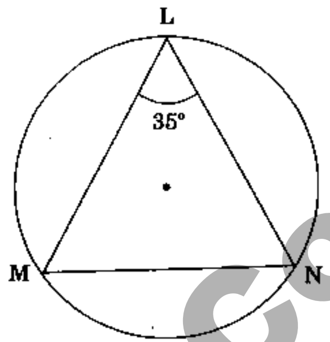
$\therefore$ m(arc PXR) = $\boxed{}$

$\therefore$ $\angle PQR = \frac{1}{2}\ m(\text{arc } \boxed{})$ .... $\boxed{}$

$= \frac{1}{2} \times 180^\circ$

$\therefore$ $\angle PQR = \boxed{}$

8) [March 2023]



In the above figure, $\angle L = 35°$, find :

(*i*) m (arc MN)

(*ii*) m (arc MLN)

Solution :

(*i*) $\angle L = \frac{1}{2}\ m$ (arc MN).......... (By inscribed angle theorem)

$\therefore$ $\boxed{} = \frac{1}{2}\ m$(arc MN)

$\therefore$ $2 \times 35 = m$(arc MN)

$\therefore$ m(arc MN) = $\boxed{}$

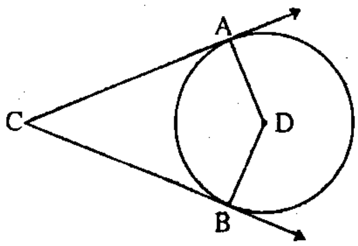
(*ii*) m(arc MLN) = $\boxed{}$ $- m$(arc MN) ....

[Definition of measure of arc]

$= 360° - 70°$

$\therefore$ m(arc MLN) = $\boxed{}$

9) [July 2023]



In the above figure, circle with centre D touches the sides of $\angle ACB$ at A and B. If $\angle ACB = 52^\circ$, complete the activity to find the measure of $\angle ADB$.

Activity :

In $\square$ ABCD,

$\angle CAD = \angle CBD = \boxed{}^\circ$ .... Tangent theorem

$\therefore \angle ACB + \angle CAD + \angle CBD + \angle ADB = \boxed{}^\circ$

$\therefore 52^\circ + 90^\circ + 90^\circ + \angle ADB = 360^\circ$

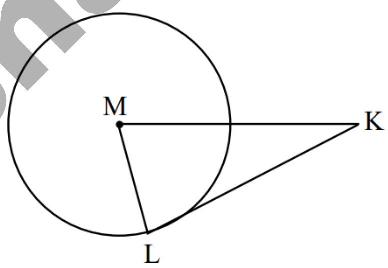
$\therefore \angle ADB + \boxed{}^\circ = 360^\circ$

$\angle ADB = 360^\circ - 232^\circ$

$\therefore \angle ADB = \boxed{}^\circ$

Q.2) B. Solve [each 2 marks]

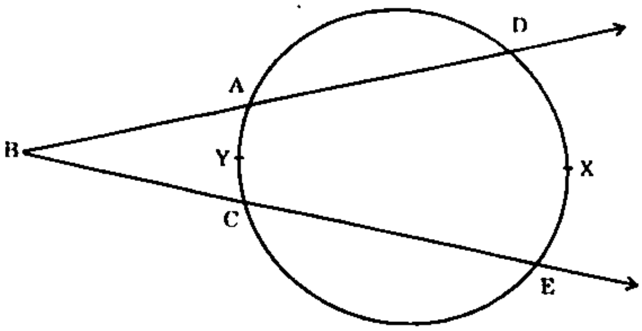
1) [March 2020]



In the figure given above, M is the centre of the circle and seg KL is a tangent segment. L is point of contact. If MK = 12, KL = $6\sqrt{3}$, then find the radius of the circle.

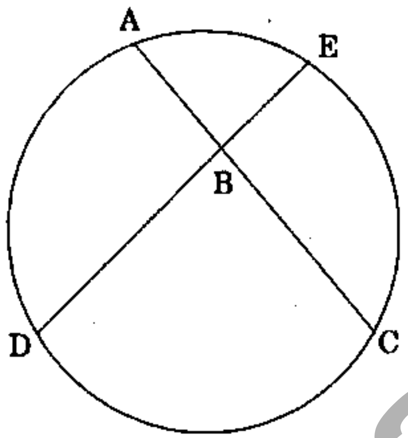
2) Measure of two arcs formed by a chord of a circle are $2x^\circ$ and $7x^\circ$. Find the mesaure of minor arc [Sept 2021]

3) [March 2022]



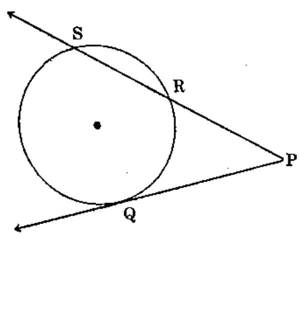
In the above figure, $m(arc\ DXE) = 105°, m(arc\ AYC) = 47°$, then find the measure of $\angle DBE$.

4) [Aug 2022]



In the above figure, chord AC and chord DE intersect each other at point B. If ∠ABE = 108° and m(arc AE) = 95°, then find m(arc DC).

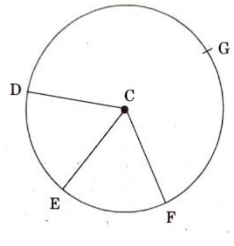
5) In the above figure, ray PQ touches the circle at point Q. If PQ=12, PR=8, Find the length of seg PS [July 2023]



6) In the given figure points G, D, E, F are points of a circle with centre C, ∠ECF = 70°, $m\ (arc\ DGF) = 200°$. Find [March 2023]

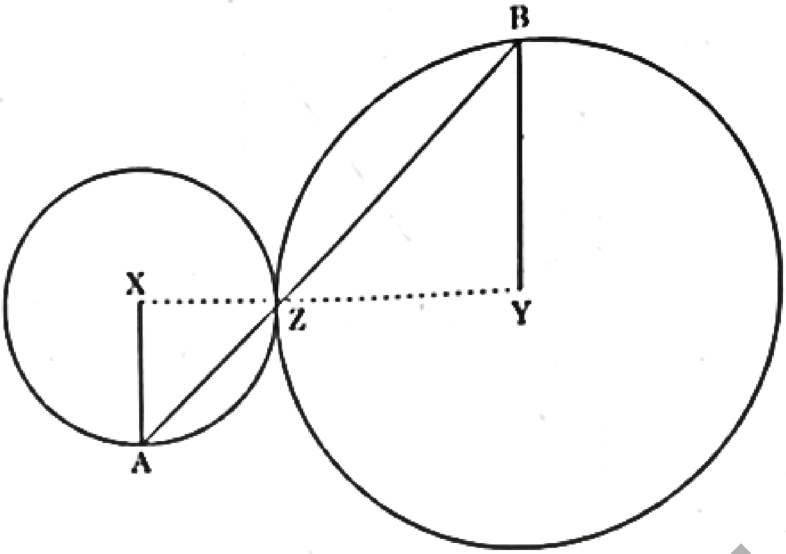
(i) m (arc DE)

(ii) m (arc DEF).



Q.3) A. **Activity [each 3 marks]**

1) [Sept 2021]



In the above figure circles with centres X and Y touch each other at point Z. A secant passing through Z intersects the circles at points A and B respectively. Then complete the following activity to prove radius XA ∥ radius YB.

Activity : Draw segments XZ and seg ZY.

By theorem of touching circles points X, Z, Y are $\boxed{}$

∠XZA ≅ $\boxed{}$ .... (I) (Vertically opposite angles)

Now seg XA ≅ seg XZ .... $\boxed{}$

∠XAZ ≅ $\boxed{}$ .... (II) (isosceles triangle theorem)

Similarly seg YB ≅ seg YZ

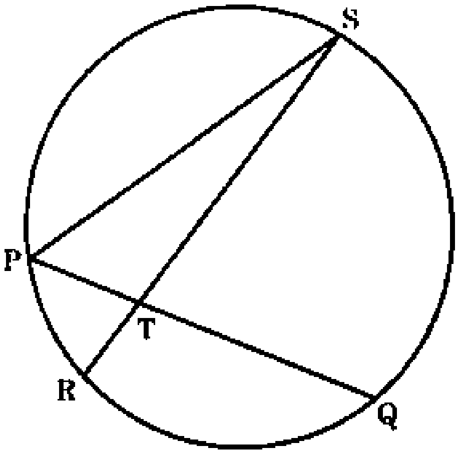
∠BZY ≅ ∠YBZ .... (III)

∠XAZ = $\boxed{}$ .... [from (I), (II) and (III)]

Radius XA ∥ radius YB .... $\boxed{}$

2)

[March 2022]



In the above figure, chord PQ and chord RS intersect each other at point T. If $\angle STQ = 58^\circ$ and $\angle PSR = 24^\circ$, then complete the following activity to verify :

$$\angle STQ = \frac{1}{2}\,[m(\text{arc PR}) + m(\text{arc SQ})]$$

Activity :

In Δ PTS,

$\angle SPQ = \angle STQ - \boxed{}$ $\because$ Exterior angle theorem

$\therefore$ $\angle SPQ = 34^\circ$

$\therefore$ $m(\text{arc QS}) = 2 \times \boxed{}^\circ = 68^\circ$ .... $\because$ $\boxed{}$

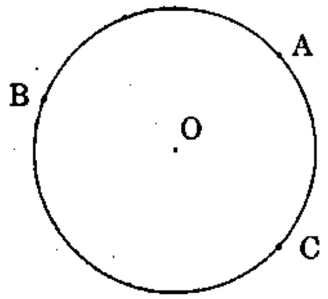
Similarly $m(\text{arc PR}) = 2\angle PSR = \boxed{}^\circ$

$\therefore$ $\frac{1}{2}\,[m(\text{arc QS}) + m(\text{arc PR})] = \frac{1}{2} \times \boxed{}^\circ = 58^\circ$ .... (I)

but $\angle STQ = 58^\circ$ .... (II) given

$\therefore$ $\frac{1}{2}\,[m(\text{arc PR}) + m(\text{arc QS})] = \boxed{\angle ....}$ .... from (I) and (II)

3)



[July 2023]

A, B, C are any points on the circle with centre O.

If $m(\text{arc BC}) = 110°$ and $m(\text{arc AB}) = 125°$, complete the following activity to find $m(\text{arc ABC})$, $m(\text{arc AC})$, $m(\text{arc ACB})$ and $m(\text{arc BAC})$.

Activity :

$m(\text{arc ABC}) = m(\text{arc AB}) + \boxed{}$

$= \boxed{}° + 110°$

$= 235°$

$m(\text{arc AC}) = 360° - m(\text{arc } \boxed{})$

$= 360° - \boxed{}°$

$= 125°$

Similarly

$m(\text{arc ACB}) = 360° - \boxed{}$

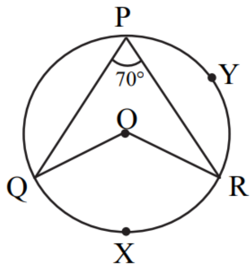
$= 235°$

and $m(\text{arc BAC}) = 360° - \boxed{}$

$= 250°$

Q.3) B. **Solve [each 3 marks]**

1) [March 2019]



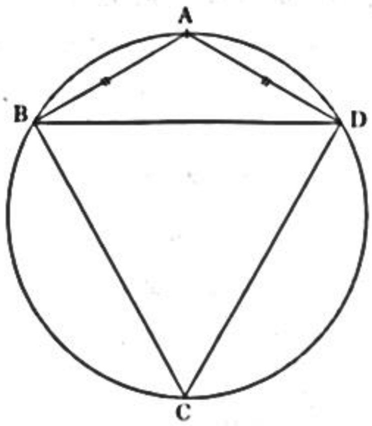
In the given figure, O is centre of circle. ∠QPR = 70° and m(arc PYR) = 160°, th value of each of the following:

(a) m(arc QXR)

(b) ∠QOR

(c) ∠PQR

3) [Sept 2021]



□ ABCD is cyclic, AB = AD, ∠BCD = 70°, then find :

(*a*) *m*(arc BCD)

(*b*) *m*(arc BAD)

(*c*) ∠ABD.

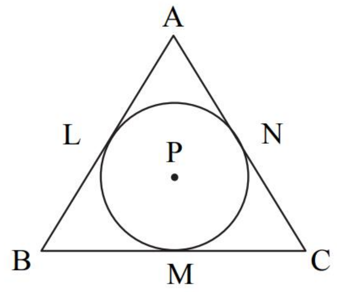
4) Prove that "Opposite angles of cyclic quadrilateral are supplementary" [March 2022] [Aug 2022]

5) Prove that, tangent segments drawn from an external point to the circle are congruent. [March 2020]

6) Prove that, "Angles inscribed in the same arc are congruent. [March 2023]

Q.4) Solve [each 4 marks]

1) [March 2019]

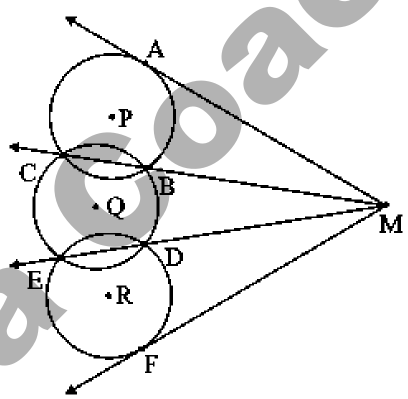


A circle with centre P is inscribed in the ΔABC. Side AB, side BC and side AC touch the circle at points L, M and N respectively. Radius of the circle is r.

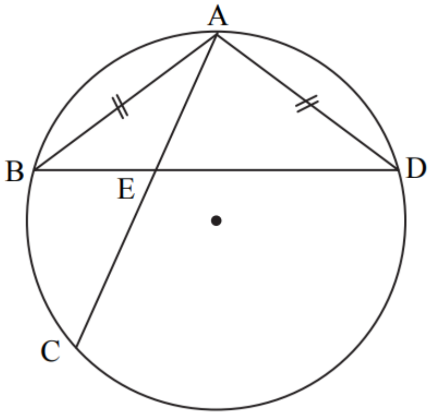
Prove that: $A(\Delta ABC) = \frac{1}{2}(AB + BC + AC) \times r$.

2) If two consecutive angles of a cyclic quadrilateral are congruent, then prove that one pair of opposite sides is parallel and other pair is congruent. [Sept 2021]

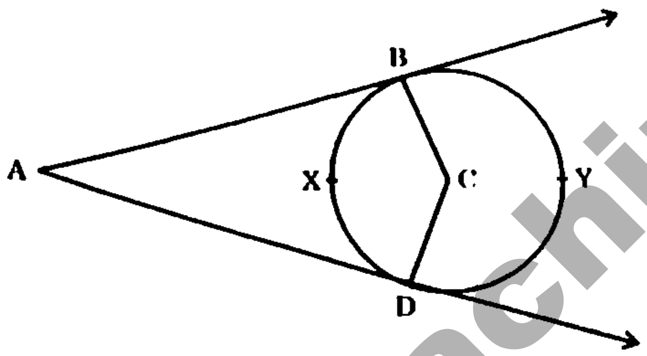
3) In the above figure, the circles with P, Q and R intersect at points B, C, D and E as shown. Lines CB and ED intersect in point M. Lines drawn from point M touch the circles at points A and F. Prove that MA = MF. [July 2019]



4) [Nov 2020]



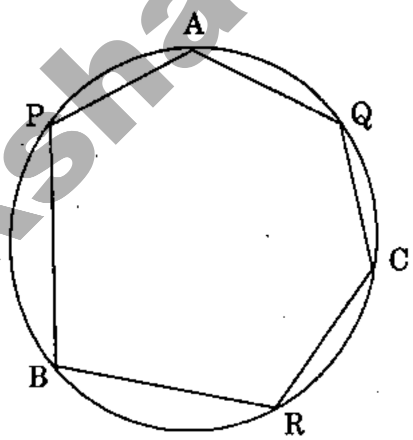
5) In the above figure, chord AB ≅ chord AD. Chord AC and chord BD intersect each other at point E. Then prove that: $AB^2 = AE \times AC$. [March 2022]



In the above figure, seg AB and seg AD are tangent segments drawn to a circle with centre C from exterior point A, then prove that:

$$\angle A = \frac{1}{2}[m(arc\ BYC) - m(arcBXD)]$$

6) [Aug 2022]



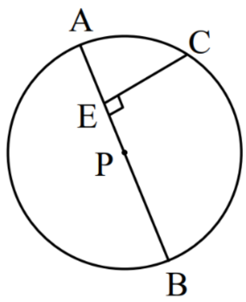
In the above figure point A, P, B, R, C, Q are on the circle. After joining the given points as shown in the figure it forms hexagon, then prove that :

$$\angle APB + \angle BRC = 360^\circ - \angle AQC.$$

Q.5) **Solve [each 3 marks]**

1) Circles with centres A, B and C touch each other externally. If AB = 3 cm, BC = 3 cm, CA = 4 cm, then find the radii of each circle. **[March 2020]**

2) **[July 2019]**



In the above figure, seg AB is a diameter of a circle with centre P. C is any point on the circle. seg CE $\perp$ seg AB. Prove that CE is the geometric mean of AE and EB. Write the proof with the help of following steps:
a. Draw ray CE. It intersects the circle at D.
b. Show that CE = ED.
c. Write the result using theorem of intersection of chords inside a circle.
d. Using CE = ED, complete the proof.

3) Let M be a point of contact of two internally touching circles. Let line AMB be their common tangent. The chord CD of the bigger circle touches the smaller circle at point N. The chord CM and chord DM of bigger circle intersect the smaller circle at point P and R respectively. **[Nov 2020]**

a. From the above information draw the suitable figure.
b. Draw seg NR and seg NM and write the two pairs of congruent angles in smaller circle considering tangent and chord.
c. By using the property which is used in (b) write the two pairs of congruent angles in the bigger circle.

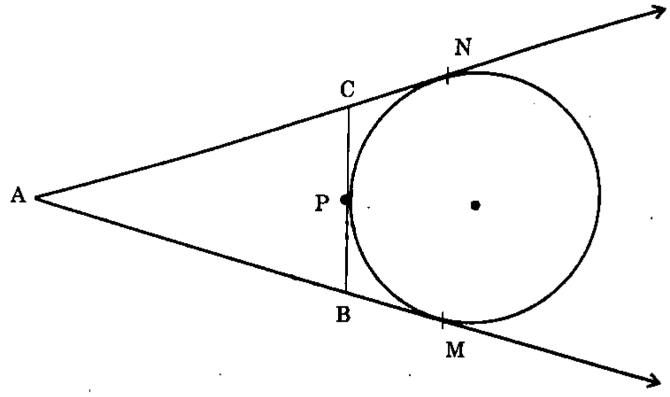
4) In a circle with centre O, PA and PB are tangents from an external point P. E is the point on the circle such that O-E-P. Tangent drawn at E intersects PA and PB in point C and D respectively. If PA = 10, then write the answers of the following questions **[Aug 2022]**

(a) Draw the suitable figure using given information.
(b) Write the relation between seg PA and seg PB.
(c) Find the perimeter of ΔPCD.

5) $\square ABCD$ is a cyclic quadrilateral where side AB $\cong$ side BC, $\angle ADC = 110°$, AC is the diagonal, then: **[July 2023]**

a) Draw the figure using given information
b) Find measure of $\angle ABC$
c) Find measure of $\angle BAC$
d) Find measure of $(arc\ ABC)$

6)



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A circle touches side BC at point P of the ΔABC, from out-side of the triangle. Further extended lines AC and AB are tangents to the circle at N and M respectively. Prove that:

$$AM = \frac{1}{2}(Perimeter\ of\ \Delta ABC)$$

ALL THE BEST***

MOST IMP QUESTIONS

CHP 4 GEOMETRIC CONSTRUCTION

PREVIOUS YEAR QUESTIONS (2019, 2020, 2021, 2022, 2023)

Chapter weightage: 7 Marks

Q.2) B. Solve [2 marks each]

1) Construct a tangent to a circle with centre O and radius 3.5 *cm* at a point P on it. [July 2019]

2) Construct tangent to a circle with centre A and radius 3.4 cm at any point P on it. [March 2019]

3) Draw a circle with centre 'O' and radius 3.2 *cm*. Draw a tangent to the circle at any point P on it. [Nov 2020]

4) Draw a circle of radius 3.2 *cm* and centre 'O'. Take any point P on it. Draw tangent to the circle through point P using the centre of the circle. [March 2022]

5) Construct a tangent to a circle with centre P and radius 3.5 *cm* at any point M on it. [Aug 2022]

Q.3) B. Solve [3 marks each]

1) Δ ABC ~ Δ LMN. In Δ ABC, AB = 5.5 cm, BC = 6 cm, CA = 4.5 cm. If MN = 4.8 cm, then construct Δ ABC and Δ LMN. [July 2019]

2) Draw a circle with radius 4.2 *cm*. Construct tangents to the circle from a point at a distance of 7 *cm* from the centre. [March 2019]

3) Draw a circle with radius 4.1 *cm*. Construct tangents to the circle from a point at a distance 7.3 *cm* from the centre. [March 2020]

4) Draw a circle with centre 'O' and radius 3.4 cm. Draw a chord MN of length 5.7 cm in it. Construct tangents at points M and N to the circle. [Nov 2020]

5) Draw a circle with centre P and radius 3.5 cm. Draw an arc AB of 120° measure. Draw tangents to the circle at point A and point B. [Sept 2021]

6) $\Delta ABC \sim \Delta PQR$. In ΔABC, AB= 5.4 cm, BC = 4.2 cm, AC = 6.0 cm, $AB : PQ = 3 : 2$, then construct ΔABC *and* ΔPQR. [March 2022]

7) Draw a circle with centre 'O' and radius 3.5 cm. Take a point P at a distance 7.5 cm from the centre. Draw tangents to the circle from point P. [Aug 2022]

8) Draw a circle of radius 3.3 cm. Draw a chord PQ of length 6.6 cm. Draw tangents to the circle at points P and Q. [March 2023]

9) $\Delta PQR \sim \Delta LTR$, *In* ΔPQR, PQ= 4.2 cm, QR= 5.4 cm , PR= 4.8 cm. Construct ΔPQR and ΔLTR such that $\frac{PQ}{LT} = \frac{3}{4}$. [July 2023]

Q.4) Solve [4 marks each]

1) Draw a circle of radius 2.7 cm and draw a chord PQ of length 4.5 cm. Draw tangents at points P and Q without using centre. [March 2020]

2) $\Delta LMN \sim \Delta LQP$, *In* ΔLMN, LM= 3.6 cm, ∠L= 50°, LN= 4.2 cm and $\frac{LM}{LQ} = \frac{4}{7}$. Then construct ΔLQP and ΔLMN. [Sept 2021]

3) Draw triangle ABC, right angle at B such that AB = 3 cm, BC =4 cm. Now construct ΔPBQ similar to ΔABC each of whose sides are $\frac{7}{4}$ times the corresponding sides of ΔABC. [Aug 2022]

4) Draw the circle with centre P and radius 3 cm. Draw a chord MN of length 4 cm. Draw tangents to the circle through points M and N which intersect in point Q. Measure the length of seg PQ [July 2023]

5) ΔSHR ~ ΔSVU. In ΔSHR, SH = 4.5 cm, HR = 5.2 cm, SR = 5.8 cm and $\frac{SH}{SV} = \frac{3}{5}$, construct ΔSVU. [March 2023]

Q.5) Solve [3 marks each]

1) Draw a circle with centre 'O' and radius 3 cm. Draw a tangent segment PA having length $\sqrt{40}$ cm from an exterior point P. [Nov 2020]

2) Draw the $\angle ABC$ of measure 65°. Draw ray BM which is a bisector of $\angle B$. Take point P on ray BM such that BP= 4 cm. Draw perpendicular on arm BC through the point P. Draw a circle with centre P and length of perpendicular as a radius. Write the measure of radius. Observe the figure and write the relation between circle and arms of the angle. **[Sept 2021]**

3) Construct two concentric circles with centre O with radii 3 cm and 5 cm. Construct tangent to a smaller circle from any point A on the larger circle. Measure and write the length of tangent segment. Calculate the length of tangent segment using Pythagoras theorem. **[March 2022]**

*****ALL THE BEST*****

MOST IMP QUESTIONS

CHP 5 CO-ORDINATE GEOMETRY

PREVIOUS YEAR QUESTIONS (2019, 2020, 2021, 2022,2023)

Chapter Weightage: 7 Marks

Q.1) A. MCQs [each 1 mark]

1) Distance of point (–3, 4) from the origin is ______. [March 2020]
(A) 7 (B) 1 (C) –5 (D) 5

2) Seg AB is parallel to Y-axis and co-ordinates of point A are (1,3), then co-ordinates of point B can be ____. [Sept 2021]
(A) (3,1) (B) (5,3) (C) (3,0) (D) $(1,-3)$

3) A line makes an angle of 60° with the positive direction of X-axis, so the slope of a line is ______. [Nov 2020]
(A) $\frac{1}{2}$ (B) $\frac{\sqrt{3}}{2}$ (C) $\sqrt{3}$ (D) $\frac{1}{\sqrt{3}}$

4) Seg AB is parallel to $X - axis$ and co-ordinates of the point A are (1, 3), then the co-ordinates of the point B can be _____. [March 2022]
(A) $(-3, 1)$ (B) $(5, 1)$ (C) $(3, 0)$ (D) $(-5, 3)$

5) From the following points ____ point lies to the right side of the origin on X-axis. [Aug 2022]
(A) $(-2, 0)$ (B) $(0, 2)$ (C) $(2, 3)$ (D) $(2, 0)$

6) Co-ordinates of origin are ________. [March 2023]
(A) (0,0) (B) (0,1) (C) (1,0) (D) (1,1)

7) A line makes an angle of 30° with positive direction of X-axis, then the slope of the line is_____. [July 2023]
(A) $\frac{1}{2}$ (B) $\frac{\sqrt{3}}{2}$ (C) $\frac{1}{\sqrt{3}}$ (D) $\sqrt{3}$

Q.1) B. Solve [each 1 mark]

1) Write the equations of x-axis and y-axis. [July 2019]

2) Find the slope of the line passing through the points A(2, 3) and B(4, 7). [March 2020]

3) Point A, B, C are collinear. If slope of line AB is $-\frac{1}{2}$, then find the slope of line BC. [Nov 2020]

4) Find the y co-ordinate of the centroid of a triangle whose vertices are $(4,-3),(7,5) and\ (-2,1)$. [March 2022]

5) Find the co-ordinates of the mid-point of the segment joining the points (22, 20) and (0, 16). [Aug 2022]

6) Find the distance between the points O (0, 0) and P (3, 4). [March 2023]

7) Find the co-ordinates of the mid-point of the segment joining the points $A(4,6)\ and\ B(-2,2)$. [July 2023]

Q.2) A. Activity [each 2 marks]

1) If C(3, 5) and D(–2, –3), then complete the following activity to find the distance between points C and D. [Nov 2020]

Activity:

Let $C(3,5) \equiv (x_1, y_1)$, $D(-2,-3) \equiv (x_2, y_2)$

$$CD = \sqrt{(x_2 - \square)^2 + (y_2 - y_1)^2} \quad \text{.... (formula)}$$

$$\therefore \quad CD = \sqrt{(-2-\square)^2 + (-3-5)^2}$$

$$\therefore \quad CD = \sqrt{\square + 64}$$

$$\therefore \quad CD = \sqrt{\square}$$

2) (iii) To find the distance between the points P(6, –6) and Q(3, –7 complete the following activity. [Sept 2021]

Activity :

Let P(6, –6) ≡ (x_1, y_1), Q(3, –7) ≡ (x_2, y_2)

By distance formula,

$$d(P, Q) = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{(3 - 6)^2 + (-7 - \boxed{})^2}$$

$$= \sqrt{(\boxed{})^2 + (-1)^2}$$

$$= \sqrt{\boxed{} + 1}$$

$$\therefore \quad d(P, Q) = \sqrt{\boxed{}}$$

Q.2) B. Solve [each 2 marks]

1) Verify whether the following points are collinear or not: A (1, –3), B (2, –5), C (–4, 7). [March 2019]

2) Find the co-ordinates of the centroid of the Δ PQR, whose vertices are P(3, –5), Q(4, 3) and R(11, –4) [July 2019]

3) Find the co-ordinates of midpoint of the segment joining the points (22, 20) and (0, 16). [March 2020]

4) If $A(-7,6)\ B(2,-2)$ *and* $C(8,5)$ are the co-ordinates of vertices of triangles, then find the co-ordinates of centroid. [Sept 2021]

5) Find slope of a line passing through the points $A(3, 1)$ and $B(5, 3)$ [March 2019]

6) Find the slope of the line passing through the points A(4 , 7) and B (2, 3). [July 2019]

7) Find the slope of a line passing through the points A(2, 5) and B(4, –1). [Nov 2020]

8) Find the distance between the points $P(-1, 1)$ *and* $Q(5, -7)$. [Aug 2022]

9) Show that points $A(-1, -1), B(0, 1), C(1, 3)$ are collinear. [March 2023]

10) Find slope of the line EF, where the co-ordinates of E are $(-4, -2)$ and co-ordinates of F are $(6,3)$ [July 2023]

Q.3) A. Activity [each 3 marks]

1) If A(6, 1), B(8, 2), C(9, 4) and D(7, 3) are the vertices of $\square$ABCD, show that $\square$ABCD is a parallelogram. [March 2020]

Solution:

Slope of line $= \dfrac{y_2 - y_1}{x_2 - x_1}$

$\therefore$ Slope of line AB $= \dfrac{2-1}{8-6} = \boxed{}$ …(i)

$\therefore$ Slope of line BC $= \dfrac{4-2}{9-8} = \boxed{}$ …(ii)

$\therefore$ Slope of line CD $= \dfrac{3-4}{7-9} = \boxed{}$ …(iii)

$\therefore$ Slope of line DA $= \dfrac{3-1}{7-6} = \boxed{}$ …(iv)

$\therefore$ Slope of line AB $= \boxed{}$ …[From (i) and (iii)]

$\therefore$ line AB || line CD

$\therefore$ Slope of line BC $= \boxed{}$ …[From (ii) and (iv)]

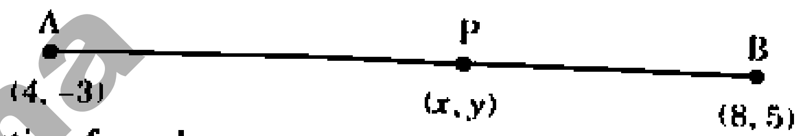
$\therefore$ line BC || line DA

Both the pairs of opposite sides of the quadrilateral are parallel.

$\therefore$ $\square$ABCD is a parallelogram.

2) Complete the following activity to find the co-ordinates of point P which divides seg AB in the ratio 3 : 1 where A(4, −3) and B(8, 5) [March 2022]

Activity :



By section formula,

$x = \dfrac{mx_2 + nx_1}{\boxed{}}$, $y = \dfrac{\boxed{}}{m+n}$

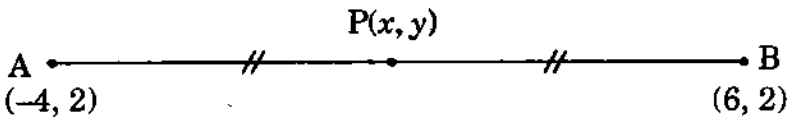
$x = \dfrac{3\times 8 + 1\times 4}{3+1}$, $y = \dfrac{3\times 5 + 1\times(-3)}{3+1}$

$= \dfrac{\boxed{} + 4}{4}$ $= \dfrac{\boxed{} - 3}{4}$

$x = \boxed{}$ $\therefore$ $y = \boxed{}$

3) **Find the co-ordinates of point P where P is the midpoint of a line segment AB with A(–4, 2) and B(6, 2).** [March 2023]

Solution :



Suppose, $(-4, 2) = (x_1, y_1)$ and $(6, 2) = (x_2, y_2)$ and co-ordinates of P are (x, y)

According to midpoint theorem,

$$x = \frac{x_1 + x_2}{2} = \frac{\boxed{} + 6}{2} = \frac{\boxed{}}{2} = \boxed{}$$

$$y = \frac{y_1 + y_2}{2} = \frac{2 + \boxed{}}{2} = \frac{4}{2} = \boxed{}$$

Co-ordinates of midpoint P are $\boxed{}$

Q.3) B Solve [each 3 marks]

1) Verify that the points A(–2, 2), B(2, 2) and C(2, 7) are the vertices of right-angled triangle. [July 2019]

2) Find the co-ordinates of centroid of the triangle whose vertices are (4, 7), (8, 4), (7, 11). [Aug 2022]

3) If A(3,5) and B(7,9), point Q divides seg AB in the ratio 2:3, find the co-ordinates of point Q. [July 2023]

Q.4) Solve [each 4 marks]

1) Find the co-ordinates of centroid of a triangle if points $D(-7,6), E(8,5) and\ F(2,-2)$ are the mid-points of the sides of that triangle. [March 2022]

Q.5) Solve [3 marks each]

1) Show that the points (2, 0), (–2, 0) and (0, 2) are the vertices of a triangle. Also state with reason the type of the triangle. [March 2020]

2) If point P divides the seg AB joining the points A(2, 1) and B(–3, 6) in the ratio 2 : 3, then determine whether the point P lies on the line $x - 5y + 15 = 0$ or not. [Sept 2021]

MOST IMPORTANT QUESTIONS

CHP 6 TRIGONOMETRY

PREVIOUS YEAR QUESTIONS (2019, 2020, 2021, 2022, 2023)

Chapter Weightage: 7 marks

Q.1) A. **MCQs [each 1 mark]**

1) $1 + tan^2\theta$=? **[March 2019]**
(A) $sin^2\theta$ (B) $sec^2\theta$ (C) $cosec^2\theta$ (D) $cot^2\theta$

2) $\sin\theta \times \operatorname{cosec}\theta$ =? **[July 2019]**
(A) 2 (B) $\frac{1}{2}$ (C) 0 (D) 1

3) The value of $2\tan 45° - 2\sin 30°$ *is* _______. **[March 2022]**
(A) 2 (B) 1 (C) $\frac{1}{2}$ (D) $\frac{3}{4}$

4) If $\tan\theta = \sqrt{3}$, then the value of θ is _______. **[Aug 2022]**
(A) 60° (B) 30° (C) 90° (D) 45°

Q.1) B. **Solve [each 1 mark]**

1) Find the value of $sin\ 30° + cos\ 60°$ **[March 2019]**

2) If $\sin\theta = \frac{1}{2}$, then find the value of θ. **[July 2019]**

3) If $3\ sin\ \theta = 4\ cos\ \theta$, then find the value of $tan\ \theta$. **[Nov 2020]**

4) If $\tan\theta = \sqrt{3}$, then find the value of θ. **[Sept 2021]**

5) If $\sin\theta = \cos\theta$, then what will be the measure of angle θ **[March 2022]**

Q.2) A. **Activity [each 2 marks]**

1) If $\sec\theta = \dfrac{25}{7}$, find the value of $\tan\theta$. [March 2020]

Solution:

$$1 + \tan^2\theta = \sec^2\theta$$

$$\therefore \quad 1 + \tan^2\theta = \left(\frac{25}{7}\right)^{\boxed{}}$$

$$\therefore \quad \tan^2\theta = \frac{625}{49} - \boxed{}$$

$$= \frac{625 - 49}{49}$$

$$= \frac{\boxed{}}{49}$$

$$\therefore \quad \tan\theta = \frac{\boxed{}}{7} \quad \text{...(by taking square roots)}$$

2) Complete the following activity to prove : [March 2022]

$$\cot\theta + \tan\theta = \operatorname{cosec}\theta \times \sec\theta$$

Activity :

$$\text{L.H.S.} = \cot\theta + \tan\theta$$

$$= \frac{\cos\theta}{\sin\theta} + \frac{\boxed{}}{\cos\theta}$$

$$= \frac{\boxed{} + \sin^2\theta}{\sin\theta \times \cos\theta}$$

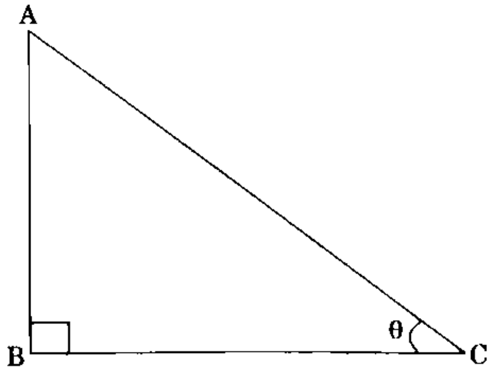
$$= \frac{1}{\sin\theta \times \cos\theta} \quad \cdots\cdots\cdots \because \boxed{}$$

$$= \frac{1}{\sin\theta} \times \frac{1}{\cos\theta}$$

$$= \boxed{} \times \sec\theta$$

$$\therefore \quad \text{L.H.S.} = \text{R.H.S.}$$

3)



[Aug 2022]

In ΔABC, $\angle B = 90°$, $\angle C = \theta°$ then complete the activity to derive the trigonometric identity.

Activity :

$AB^2 + BC^2 = \boxed{}$ .... (Pythagoras theorem)

$\therefore \quad \dfrac{AB^2}{AB^2} + \dfrac{BC^2}{AB^2} = \dfrac{AC^2}{AB^2}$ .... dividing by AB^2

$\therefore \quad 1 + \dfrac{BC^2}{AB^2} = \dfrac{AC^2}{AB^2}$

But $\dfrac{\boxed{}}{AB^2} = \cot^2\theta$ and $\dfrac{AC^2}{\boxed{}} = \operatorname{cosec}^2\theta$

$\therefore \quad 1 + \boxed{} = \operatorname{cosec}^2\theta.$

4) Show that, $\cot\theta + \tan\theta = \operatorname{cosec}\theta \times \sec\theta$

[March 2023]

Solution :

L.H.S. $= \cot\theta + \tan\theta$

$= \dfrac{\cos\theta}{\sin\theta} + \dfrac{\sin\theta}{\cos\theta}$

$= \dfrac{\boxed{} + \boxed{}}{\sin\theta \times \cos\theta}$

$= \dfrac{1}{\sin\theta \times \cos\theta}$ ....

$= \dfrac{1}{\sin\theta} \times \dfrac{1}{\boxed{}}$

$= \operatorname{cosec}\theta \times \sec\theta$

L.H.S. = R.H.S.

$\therefore \quad \cot\theta + \tan\theta = \operatorname{cosec}\theta \times \sec\theta.$

5) Complete the following activity to prove $\cot\theta + \tan\theta = \operatorname{cosec}\theta \times \sec\theta$. [July 2023]

Activity :

$$\text{L.H.S.} = \cot\theta + \tan\theta$$

$$= \frac{\boxed{}}{\sin\theta} + \frac{\sin\theta}{\cos\theta}$$

$$= \frac{\boxed{} + \boxed{}}{\sin\theta \cdot \cos\theta}$$

$$= \frac{1}{\sin\theta \cdot \cos\theta} \quad (\because \sin^2\theta + \cos^2\theta = 1)$$

$$= \frac{1}{\sin\theta} \times \frac{1}{\cos\theta}$$

$$= \boxed{} \times \sec\theta$$

$\therefore$ L.H.S. = R.H.S.

$\therefore \cot\theta + \tan\theta = \operatorname{cosec}\theta \times \sec\theta$

Q.2) B. **Solve [each 2 marks]**

1) If $sec\theta = \frac{25}{7}$then find the value of tan θ. [March 2019]

2) If cos θ = $\frac{5}{13}$, then find sin θ. [July 2019]

3) If sin θ = $\frac{7}{25}$, then find the value of cos θ. [Sept 2021]

4) A person is standing at a distance of 80 metres from a Church and looking at its top. The angle of elevation is of 45°. Find the height of the Church. [March 2020]

5) If $\sin\theta = \frac{11}{61}$, then find the value of $\cos\theta$ using trigonometric identity. [March 2022]

6) If $\sin\theta = \frac{7}{25}$,then find the values of $\cos\theta$ *and* $\tan\theta$. [Aug 2022]

Q.3) B. **Solve [each 3 marks]**

1) Prove that: $\sqrt{\dfrac{1-\sin\theta}{1+\sin\theta}} = \sec\theta - \tan\theta$ [July 2019]

2) Prove that: [Nov 2020]

$$\frac{1}{\sec\theta - \tan\theta} = \sec\theta + \tan\theta.$$

3) Prove that : [Sept 2021]

$$\sqrt{\frac{1-\cos A}{1+\cos A}} = \operatorname{cosec} A - \cot A.$$

4) When an observer at a distance of 12m from a tree looks at the top of the tree, the angle of deviation is 60°. What is the height of the tree? ($\sqrt{3} = 1.73$) [March 2019]

5) Show that : [March 2022]

$$\frac{\tan A}{(1+\tan^2 A)^2} + \frac{\cot A}{(1+\cot^2 A)^2} = \sin A \times \cos A.$$

6) Prove that: [Aug 2022]

$$\sec\theta + \tan\theta = \frac{\cos\theta}{1-\sin\theta}$$

7) A person is standing at a distance of 50 m from a temple looking at its top. The angle of elevation is of 45° . Find the height of the temple. [March 2023]

8) If $\cos\theta = \frac{3}{5}$, then find $\sin\theta$. [July 2023]

Q.4) **Solve [each 4 marks]**

1) A straight road leads to the foot of the tower of height 48 m. From the top of the tower the angles of depression of two cars standing on the road are 30° and 60° respectively. Find the distance between the two cars. ($\sqrt{3}$=1.73) [Nov 2020]

Q.5) **Solve [each 3 marks]**

1) If $\sin\theta + \sin^2\theta = 1$ show that: $\cos^2\theta + \cos^4\theta = 1$ [March 2020]

[March 2023]

2) Eliminate θ if $x = r\cos\theta$ and $y = r\sin\theta$.

3) From top of the building, Ramesh is looking at a bicycle parked at some distance away from the building on the road.

[July 2023]

If

AB → Height of building is 40 m

C → Position of bicycle

A → Position of Ramesh on top of the building

$\angle$MAC is the angle of depression and $m\angle MAC = 30^\circ$, then :

(a) Draw a figure with the given information.

(b) Find the distance between building and the bicycle. $(\sqrt{3} = 1 \cdot 73)$.

ALL THE BEST

MOST IMPORTANT QUESTIONS

CHP 7 MENSURATION

PREVIOUS YEAR QUESTIONS (2019, 2020, ~~2021, 2022,~~ 2023)

Chapter Weightage: 10 marks

Q.1) A. MCQs [each 1 mark]

1) Find the volume of a cube of side 3 cm: [March 2020]
   (A) $27cm^3$ (B) $9\ cm^3$ (C) $81cm^3$ (D) $3\ cm^3$

2) Radius of a sector of a circle is 5 cm and length of arc is 10 cm, then the area of a sector is ______. [Nov 2020]
   (A) $50\ cm^2$ (B) $25\ cm^2$ (C) $25\ m^2$ (D) $10\ cm^2$

3) If radius of the base of cone is 7 cm and height is 24 cm, then find its slant height: **[March 2023]**
   (A) 23 cm (B) 26 cm (C) 31 cm (D) 25 cm

4) Find the volume of a cube of side 10 cm is ________ [July 2023]
   (A) $1\ cm^3$ (B) $10\ cm^3$ (C) $100\ cm^3$ (D) $1000\ cm^3$

Q.1. B) Solve the following [each 1 mark]

1) If the side of a cube is $5cm$, then find its volume. [July2019]

Q.2. A. Activity [each 2 marks]

1) [March 2019]

How many solid cylinders of radius 6 cm and height 12 cm can be made by melting a solid sphere of radius 18 cm ?

Activity : Radius of the sphere, r = 18 cm

For cylinder, radius R = 6 cm, height H = 12 cm

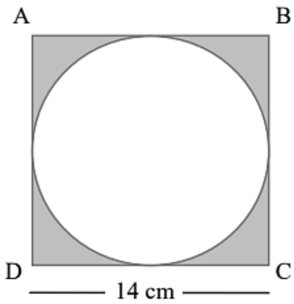
$$\text{Number of cylinders can be made} = \frac{\text{Volume of the sphere}}{\boxed{}}$$

$$= \frac{\frac{4}{3}\pi r^3}{\boxed{}}$$

$$= \frac{\frac{4}{3} \times 18 \times 18 \times 18}{\boxed{}}$$

$$= \boxed{}$$

2) [July 2019]

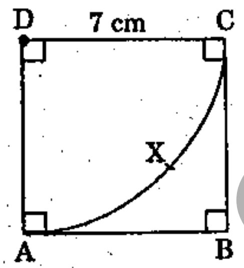


A circle is inscribed in square ABCD of side 14 cm. Complete the following activity to find the area of shaded portion.
Activity:
Area of square ABCD = $\boxed{}$
$= 14^2$
$= 196\ cm^2$

Area of circle $= \pi r^2$
$= \frac{22}{7} \times 7^2$
$= \boxed{}\ cm^2$

Area of shaded portion = Area of square ABCD – Area of circle
$= 196 - \boxed{}$
$= \boxed{}\ cm^2$

3) [July 2023]



In the above figure, side of square ABCD is 7 cm with centre D and radius DA sector D–AXC is drawn.

Complete the following activity to find the area of square ABCD and sector D–AXC.

Activity :

Area of square = $\boxed{}$ .... formula
$= (7)^2$
$= 49\ cm^2$

Area of sector (D–AXC) = $\boxed{}$ .... formula
$= \frac{\boxed{}}{360} \times \frac{22}{7} \times \boxed{}$
$= 38.5\ cm^2$

4) **Find the surface area of a sphere of radius 7 cm.** [March 2023]

Solution :

Surface area of sphere $= 4\pi r^2$

$$= 4 \times \frac{22}{7} \times \boxed{}^2$$

$$= 4 \times \frac{22}{7} \times \boxed{}$$

$$= \boxed{} \times 7$$

$\therefore$ Surface area of sphere $= \boxed{}$ sq.cm.

Q.2. B) Solve the following [each 2 marks]

1) In a right circular cone, if perpendicular height is 12 cm and radius is 5 cm, find its slant height. **[March 2019]**
2) Find the surface area of a sphere of radius 3.5 *cm* **[March 2019]**
3) Perpendicular height of a cone is 12 *cm* and its slant height is 13 *cm*. Find the radius of the base of cone. **[July 2019]**
4) If the length of an arc of sector of a circle is 20 *cm* and if radius is 7*cm*, find the area of the sector. **[July 2019]**
5) Find the surface area of a sphere of radius 7 cm. **[March 2020]**

Q.3. A) Activity [each 3 marks]

1) Measure of arc of a circle is 36° and its length is 176 cm. Then complete the following activity to find the radius of circle. **[July 2019]**

Activity:

Here, measure of arc $= \theta = 36°$

Length of arc $= l = 176$ cm

$\therefore$ Length of arc $(l) = \frac{\theta}{360} \times \boxed{}$ .... (formula)

$\therefore$ $\boxed{} = \frac{36}{360} \times 2 \times \frac{22}{7} \times r$

$\therefore$ $176 = \frac{1}{\boxed{}} \times \frac{44}{7} \times r$

$\therefore$ $r = \frac{176 \times \boxed{}}{44}$

$\therefore$ $r = \boxed{} \times 70$

Radius of circle $(r) = \boxed{}$ cm

Q.3. B) Solve the following [each 3 marks]

1) A metal cuboid of measures 16 cm × 11 cm × 10 cm was melted to make coins. How many coins were made, if the thickness and diameter of each coin was 2 mm and 2 cm respectively? ($\pi = 3.14$) **[March 2020]**

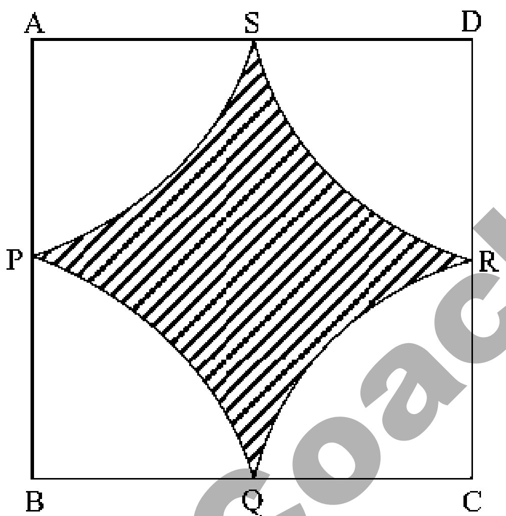
2) Radii of the top and base of frustum are 14 cm and 8 cm respectively. Its height is 8 cm. Find its curved surface area. ($\pi = 3.14$) **[July 2019]**

3) The radii of circular ends of a frustum are 14 cm and 6 cm respectively and its height is 6 cm. Find its curved surface area. ($\pi = 3.14$) **[March 2023]**

4) The radius of a circle is 6 cm, the area of a sector of this circle is $15\pi\ sq.cm$. Find the measure of the arc and the length of the arc corresponding to that sector. **[July 2023]**

Q.4) Solve the following [each 4 marks]

1) **[March 2020]**



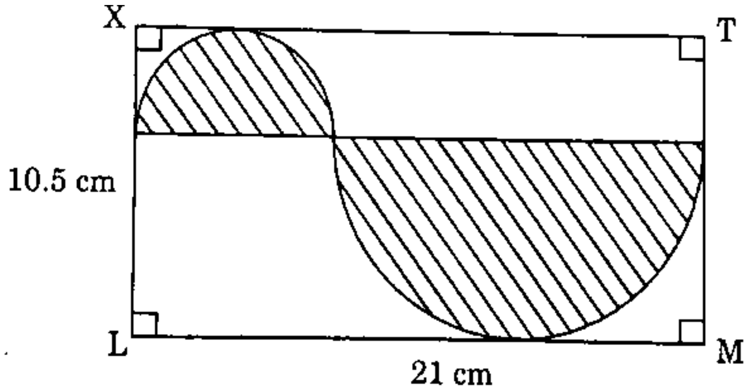
In the figure given above $\square ABCD$ is a square of side 50 m. Points P, Q, R, S are midpoints of side AB, side BC, side CD, side AD respectively.
Find area of shaded region.

2) A bucket is in the form of a frustum of a cone. It holds 28.490 litres of water. The radii of the top and the bottom are 28 cm and 21 cm respectively. Find The height of the bucket. **[July 2023]**

3) An ice-cream pot has a right circular cylindrical shape. The radius of the base is 12 cm and height is 7 cm. This pot is completely filled with ice-cream. The entire ice-cream is given to the students in the form of right circular ice-cream cones, having diameter 4 cm and height is 3.5 cm. If each student is given one cone, how many students can be served? **[March 2023]**

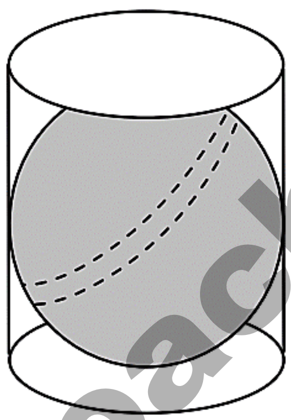
Q.5) Solve the following [each 3 marks]

1) [March 2019]



In the above figure, □XLMT is a rectangle. LM = 21 cm, XL = 10.5 cm. Diameter of the smaller semicircle is half the diameter of the larger semicircle. Find the area of non-shaded region.

2) [July 2019]



In the above figure, a sphere is placed in a cylinder. It touches the top, bottom and the curved surface of the cylinder. If radius of the base of cylinder is 'r',
write the answer of the following questions.
a. What is the height of the cylinder in terms of 'r'?
b. What is the ratio of the curved surface area of the cylinder and the surface area of the sphere?
c. What is the ratio of volumes of the cylinder and of the sphere?

ALL THE BEST