Gurukul Coaching Classes		
	Weekly Test [MODEL ANSWER]	
Std: SSC (B)	**Subject: Mathematics II**	**Time: 2Hrs**
Date : 12/May/2019	**ch-1**	**Max Marks: 40**

Q.1 Solve the following questions (9th std) (ANY FOUR) **4**

1) Ans. 60°

2) Ans. 70°

3) Ans. 2 sin 30° + cos 0° + 3 sin 90° = 1 + 1 + 3
∴ 2sin 30° + cos 0° + 3 sin 90° = 5

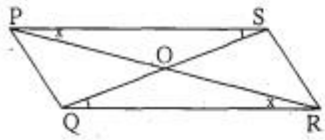
4) Ans. The intersection of ray SP and ray ST is point S.

5) Ans. If a quadrilateral is parallelogram then it opposite angles are congruent.

6) Ans. Ray ST and ray SR.

Q.2 Solve the following questions (9th std) (ANY TWO) **4**

1) Ans.



Given : □PQRS is a parallelogram. Diagonals PR and QS intersect in point O.

To prove : seg PO ≅ seg RO,
seg SO ≅ seg QO.

Proof : In ΔPOS and ΔROQ
∠OPS ≅ ∠ORQ .... alternate angles
side PS ≅ side RQ .... opposite sides of parallelogram
∠PSO ≅ ∠RQO .... alternate angles
∴ ΔPOS ≅ ΔROQ .... ASA test
∴ seg PO ≅ seg RO ....
and seg SO ≅ seg QO .... }..... corresponding sides of congruent triangles

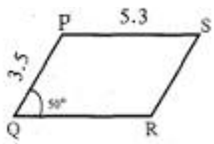
2) Ans. $d(U,A) = 215$; $d(V,A) = 140$; $d(U,V) = 75$

$d(U,V) + d(V,A) = 75 + 140 = 215$; $d(U,A) = 215$

$$\therefore d(U,A) = d(U,V) + d(V,A)$$

∴ The city V is between the cities U and A.

3) Ans.



□PQRS is a parallelogram.
∴ ∠Q + ∠P = 180° .... interior angles are supplementary.
∴ 50° + ∠P = 180°
∴ ∠P = 180° − 50° = 130°
Now , ∠P = ∠R and ∠Q = ∠S ....opposite angles of a parallelogram.
∴ ∠R = 130° and ∠S = 50°
Similarly, PS = QR and PQ = SR ....opposite sides of a parallelogram.
∴ QR = 5.3 and SR = 3.5

Q.3 Choose the correct alternative: **5**

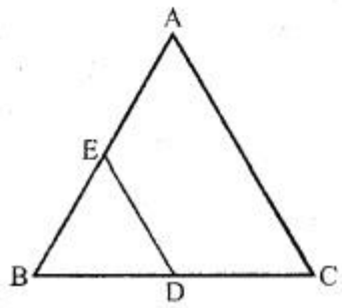
1) Ans. (d)

We know if sides of two similar triangles are in ratio a:b then area of these triangles are in ratio $a^2 b^2$
According to question, ratio of sides= 4:9
Hence ratio of areas = $4^2 : 9^2$
= 16:81
So, the correct option is (d).

2) Ans. (c)

ΔABC and ΔBDE are equilateral triangles and D is the mid-point of BC

$\because$ ΔABC and ΔBDE are both equilateral triangles



$\therefore$ They are similar also

$$\therefore \frac{\text{area of } \Delta ABC}{\text{area of } \Delta BDE} = \frac{BC^2}{BD^2} = \frac{BC^2}{\left(\frac{1}{2}BC^2\right)}$$

{D is mid point of BC}

$$= \frac{BC^2}{\frac{1}{4}BC^2} = \frac{4BC^2}{BC^2} = \frac{4}{1}$$

$\therefore$ Ratio is 4 : 1 (c)

3) Ans. (b)

$\Delta DEF \sim \Delta ABC$

AB = 3 cm, BC = 2 cm, CA = 2.5 cm, EF = 4 cm

$\because$ Δs are similar

$$\frac{DE}{AB} = \frac{EF}{BC} = \frac{FD}{CA}$$

$$\Rightarrow \frac{DE}{3} = \frac{4}{2} = \frac{FD}{2.5}$$

Now $\frac{DE}{3} = \frac{4}{2}$

$$\Rightarrow DE \frac{3 \times 4}{2} = 6 \text{ cm}$$

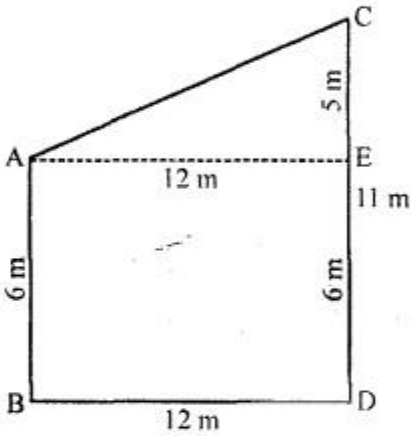
and $FD = \frac{4}{2} \Rightarrow FD = \frac{4 \times 2.5}{2} = 5$ cm

$\therefore$ Perimeter of ΔDEF

= 6 + 4 + 5 = 15 cm (b)

4) Ans. (c)

Let length of pole AB = 6 m
and of pole CD = 11 m
and distance between their foot = 12 m
i.e., BD = 12 m



From A, draw AE || BD, then

AE = BD = 12 m

ED = AB = 6 m and CE = 11 – 6 = 5 m

Now in right ΔAEC

$AC^2 = AE^2 + CE^2$

$= (12)^2 + (5)^2 = 144 + 25 = 169 = (13)^2$

∴ AC = 13

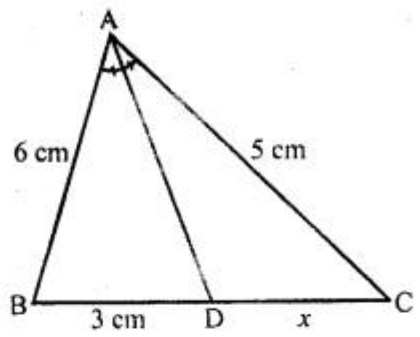
Hence distance between their tops = 13 m

(c)

5) Ans. (b)

In ΔABC, AD is the bisector of ∠BAC

AB = 6 cm, AC = 5 cm, BD = 3 cm



Let DC = x

In ΔABC

∵ AD is the bisector of ∠A

$\therefore \frac{AB}{AC} = \frac{BD}{DC} \Rightarrow \frac{6}{5} = \frac{3}{x}$

$\Rightarrow x = \frac{3 \times 5}{6} = \frac{5}{2} = 2.5$

∴ DC = 2.5 cm (b)

Q.4 Solve the following questions (ANY TWO) 4

1) Ans. Let first triangle be Δ_1, its base & height be b_1 & h_1 respectively. Let second triangle be Δ_2, its base & height be b_2 & h_2 respectively.

$B_1 = 9$, $h_1 = 5$, $b_2 = 10$ & $h_2 = 6$ [Given]

$$\frac{A(\Delta_1)}{A(\Delta_2)} = \frac{b_1 \times h_1}{b_2 \times h_2}$$

[Property of ratio areas of two triangles]

$$= \frac{9 \times 5}{10 \times 6}$$

$$\therefore \frac{A(\Delta_1)}{A(\Delta_2)} = \frac{3}{4}$$

i.e. $A(\Delta_1) : A(\Delta_2) = 3:4$.

2) Ans. $$\frac{A(\Delta ABC)}{A(\Delta ADB)} = \frac{BC}{AD}$$

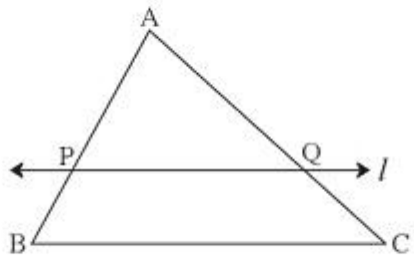
[Triangles with common base]

$$\frac{A(\Delta ABC)}{A(\Delta ADB)} = \frac{4}{8}$$

$$\therefore \frac{A(\Delta ABC)}{A(\Delta ADB)} = \frac{1}{2}$$

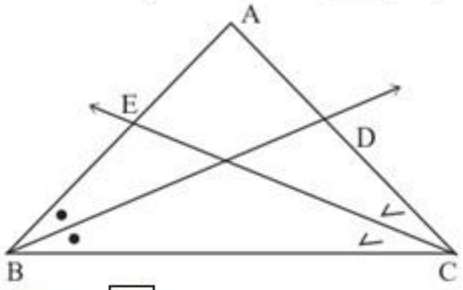
3) Ans. In figure line l interesects the side AB and side AC of Δ ABC in the points P and Q respectively and $\frac{AP}{PB} = \frac{AQ}{QC}$, hence line $l \parallel$ seg BC.

This theorem can be proved by indirect method.



Q.5 Complete the following Activities (ANY FOUR) 8

1) Ans. In ΔABC, ray BD bisects $\angle \boxed{ABC}$ [Given]



$\therefore \frac{AB}{BC} = \frac{\boxed{AD}}{DC}$

.... 1 [Angle bisector property of a triangle]

In ΔABC, ray CE bisects $\angle ACB$ [Given]

$\therefore \frac{AC}{\boxed{BC}} = \frac{AE}{BE}$

.... 2 [Angle bisector property of a triangle]

seg $AB \cong$ seg $\boxed{AC}$ ...... 3 [Given]

$\therefore \frac{AB}{BC} = \frac{AE}{\boxed{BE}}$ ...... 4 [From 2 & 4]

In ΔABC, $\frac{AD}{DC} = \frac{\boxed{AE}}{BE}$ [From 1 & 4]

$\therefore$ seg $\boxed{ED} \parallel$ side BC [Converse of B.P.T.]

2) Ans. Let Δ_1 and Δ_2 be two similar triangles with their corresponding sides s_1 and s_2 respectively.

$\frac{s_1}{s_2} = \boxed{\frac{3}{5}}$ [Given] 1

$\Delta_1 \sim \Delta_2$ [Given]

$\frac{\boxed{A(\Delta_1)}}{A(\Delta_2)} = \frac{S_1^2}{\boxed{S_2^2}}$

[Theorem on areas of similar triangles]

$\frac{A(\Delta_1)}{A(\Delta_2)} = \boxed{\frac{3^2}{5^2}}$ [From 1]

$\therefore A(\Delta_1)\ A(\Delta_2) = \boxed{9 : 25}$

3) Ans. $9 \times A(\Delta PQR) = \boxed{16} \times A(\Delta LMN)$ .... (Given)

$\therefore \frac{9}{16} = \frac{A(\Delta LMN)}{A(\Delta \boxed{PQR})}$

i.e. $\frac{A(\Delta LMN)}{A(\Delta PQR)} = \frac{\boxed{9}}{16}$ ..... (i)

In ΔLMN and ΔPQR, ...(Given)

$\frac{A(\Delta LMN)}{A(\Delta PQR)} = \frac{MN^2}{QR^2}$ ...... (Theorem on areas of similar triangles)

$\therefore \boxed{\frac{9}{16}} = \frac{MN^2}{20^2}$

$\therefore \boxed{\frac{3}{4}} = \frac{MN}{20}$ .... (Taking square roots)

$\therefore MN = \frac{3 \times \boxed{20}}{4}$

$\therefore MN = \boxed{15}$

$\therefore MN = \boxed{15}$ units

4) Ans. seg AD $\parallel$ seg $\boxed{BC}$ [Given]

$\therefore \angle \boxed{PAD} \cong \angle PCB$ ......1 [Alternate angles theorem]

In ΔAPD & ΔCPB

(i) $\angle PAD \cong \angle \boxed{PCB}$ [From 1]

(ii) $\angle APD \cong \angle CPB$ [$\boxed{\text{Vertically opposite angles}}$]

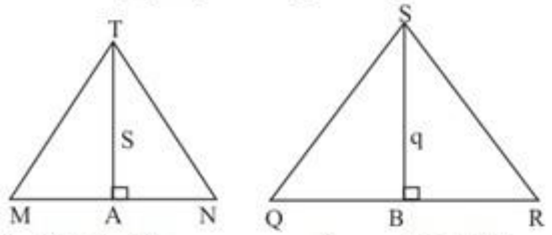
$\therefore \Delta APD \sim \Delta CPB$ [AA test]

$\therefore \frac{AP}{CP} = \frac{\boxed{PD}}{PB}$

$\therefore \frac{AP}{PD} = \frac{\boxed{CP}}{PB}$ [Alternando]

i.e. $\frac{AP}{PD} = \boxed{\frac{PC}{BP}}$

5) Ans. $\Delta MNT \sim \Delta QRS$ [Given]



$\therefore \angle M \cong \angle Q$ .... 1 [c.a.s.t]

In ΔMAT & ΔQBS

$\angle M \cong \angle Q$ [From 1]

$\angle MAT \cong \angle QBS$ [Each 90°]

$\therefore \Delta MAT \sim \Delta QBS$

$\therefore \frac{TM}{SQ} = \frac{TA}{SB}$ .... 2 [c.s.s.t]

$\therefore \frac{A(\Delta TMN)}{A(\Delta SQR)} = \frac{TM^2}{SQ^2}$

[Theorem on areas of similar triangles]

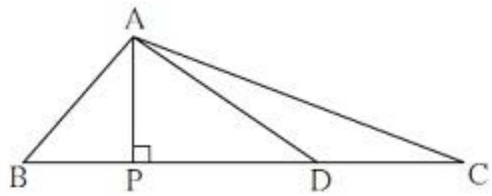
$\therefore \frac{A(\Delta TMN)}{A(\Delta SQR)} = \frac{TA^2}{SB^2}$ [From 2]

$\therefore \frac{A(\Delta TMN)}{A(\Delta SQR)} = \frac{5^2}{9^2}$

$\frac{A(\Delta TMN)}{A(\Delta SQR)} = \frac{25}{81}$

Q.6 Solve the following questions **15**

1) Ans. : Point A is common vertex of Δ ABD, Δ ADC and Δ ABC and their bases are collinear. Hence, heights of these three triangles are equal



BC = 15, DC = 6 $\therefore$ BD = BC – DC = 15 – 6 = 9

$\frac{A(\Delta ABD)}{A(\Delta ABC)} = \frac{BD}{BC}$ .... heights equal, hence areas proportional to bases.

$= \frac{9}{15} = \frac{3}{5}$

$\frac{A(\Delta ABD)}{A(\Delta ADC)} = \frac{BD}{DC}$ .... heights equal, hence areas proportional to bases.

$= \frac{9}{6} = \frac{3}{2}$

2) Ans. : In Δ ABC point P and D are on side AC, hence B is common vertex of Δ ABD, Δ BDC, Δ ABC and Δ APB and their sides AD, DC, AC and AP are collinear. Heights of all the triangles are equal. Hence, areas of these triangles are proportinal to their bases. AC = 16, DC = 9

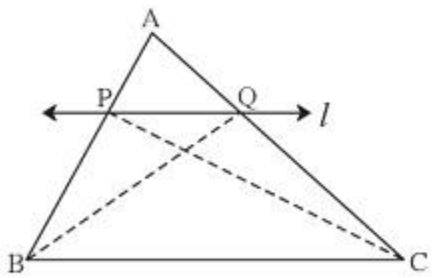
$\therefore$ AD = 16 − 9 = 7

$\therefore \dfrac{A(\Delta ABD)}{A(\Delta ABC)} = \dfrac{AD}{AC} = \dfrac{7}{16}$ .... triangles having equal heights

$\dfrac{A(\Delta BDC)}{A(\Delta ABC)} = \dfrac{DC}{AC} = \dfrac{9}{16}$ .... triangles having equal heights

$\dfrac{A(\Delta ABD)}{A(\Delta BDC)} = \dfrac{AD}{DC} = \dfrac{7}{9}$ .... triangles having equal heights

3) Ans.



Given : In Δ ABC line $l \parallel$ line BC and line l intersects AB and AC in point P and Q respectively

To prove : $\dfrac{AP}{PB} = \dfrac{AQ}{QC}$

Construction: Draw seg PC and seg BQ

Proof : Δ APQ and Δ PQB have equal heights.

$\therefore \dfrac{A(\Delta APQ)}{A(\Delta PQB)} = \dfrac{AP}{PB}$ .... (I) (areas proportionate to bases)

and $\dfrac{A(\Delta APQ)}{A(\Delta PQC)} = \dfrac{AQ}{QC}$ .... (II) (areas proportionate to bases)

seg PQ is common base of Δ PQB and Δ PQC. seg PQ $\parallel$ seg BC, hence Δ PQB and Δ PQC have equal heights.

$A(\Delta PQB) = A(\Delta PQC)$ .... (III)

$\dfrac{A(\Delta APQ)}{A(\Delta PQB)} = \dfrac{A(\Delta APQ)}{A(\Delta PQC)}$ .... [from (I), (II) and (III)]

$\therefore \dfrac{AP}{PB} = \dfrac{AQ}{QC}$ .... [from (I) and (II)]

4) Ans. PQ = PM + MQ [P-M-Q]

$\therefore 25 = 15 + MQ$

$\therefore MQ = 25 - 15 = 10$

PR = PN + NR [P – N – R]

$\therefore 20 = PN + 8$

$\therefore PN = 20 - 8 = 12$

$\dfrac{PM}{MQ} = \dfrac{15}{10} = \dfrac{3}{2}$ 1

$\dfrac{PN}{NR} = \dfrac{12}{8} = \dfrac{3}{2}$ 2

In ΔPRQ, $\dfrac{PM}{MQ} = \dfrac{PN}{NR}$ [From 1 & 2]

$\therefore$ Seg NM is parallel to side QR

[Converse of B.P.T]

5) Ans. Side AB $\parallel$ side CD [Given]

$\therefore \angle OAB \cong \angle OCD$

..... [Alternate angles theorem]

In ΔAOB and ΔCOD

(i) $\angle AOB \cong \angle COD$

[Vertically opposite angles]

(ii) $\angle OAB \cong \angle OCD$ [From 1]

$\therefore \Delta AOB \sim \Delta COD$ [AA test]

$\therefore \frac{AB}{DC} = \frac{OB}{OD}$ [c.s.s.t]

$\therefore \frac{20}{6} = \frac{15}{OD}$

$\therefore OD = \frac{15 \times 6}{20}$

$\therefore OD = 4.5$ units