Gurukul Coaching Classes

Weekly Test [MODEL ANSWER]

Std: SSC (A)	**Subject: Mathematics II**	**Time: 2Hrs**
Date : 12/May/2019	**ch-1**	**Max Marks: 40**

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

1) Ans. Converse: If a figure is a triangle then the sum of all angles of the figure is 180°.

2) Ans. If a number is a prime number then it has only two divisors.

3) Ans. Converse: If two angles are complementary then their sum is 90°.

4) Ans. (i) IVth quadrant.

(ii) IInd quadrant.

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

1) Ans. $2\tan 45^\circ + \cos 30^\circ - \sin 60^\circ$

$= 2 \times 1 + \frac{\sqrt{3}}{2} - \frac{\sqrt{3}}{2}$

$= 2 + 0$

$= 2$

2) Ans. 1) The co-ordinates of point E are (2, 1)

2) The co-ordinates of point F are (-3, 3)

3) The co-ordinates of point G are (-4, -2)

4) The co-ordinates of point T are (3, -1)

3) Ans. $\cos 60^\circ \text{ x } \cos 30^\circ + \sin 60^\circ \text{ x } \sin 30^\circ$

$= \frac{1}{2} \text{ x } \frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2} \text{ x } \frac{1}{2}$

$= \frac{\sqrt{3}}{4} + \frac{\sqrt{3}}{4}$

$= \frac{2\sqrt{3}}{4}$

$= \frac{\sqrt{3}}{2}$

$\therefore \cos 60^\circ \text{ x } \cos 30^\circ + \sin 60^\circ \text{ x } \sin 30^\circ = \frac{\sqrt{3}}{2}$

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

1) Ans. (a)

Ratio in the areas of two similar triangles

$= 9 \text{ cm}^2 : 16 \text{ cm}^2 = 9 : 16$

$\because$ The areas of similar triangles are proportional to the squares of their corresponding sides

$\because$ Ratio in their corresponding sides

$= \sqrt{\frac{9}{16}} = \frac{3}{4} = 3 : 4$ (a)

2) Ans. (a)

The corresponding angles of two isosceles triangles are equal

∴ These are similar

Ratio in their areas = 16 : 25

∵ The ratio of areas of similar triangles are proportion to the squares of their corresponding altitudes (heights)

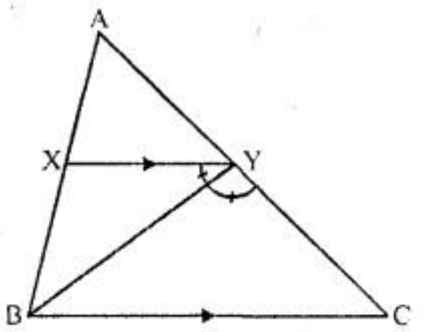
∴ Ratio in their altitudes = $\sqrt{\frac{16}{25}} = \frac{4}{5}$

= i.e., 4 : 5 (a)

3) Ans. (a)

In ΔABC, $XY \parallel BC$

BY is the bisector of $\angle XYC$



∴ $\angle XYB = \angle CXB$ ....(*i*)

∵ $XY \parallel BC$

∴ $\angle XYB = \angle XBC$ (Alternate angles) ....(*ii*)

From (*i*) and (*ii*)

$\angle CYB = \angle YBC$

∴ BC = CY (a)

4) Ans. (a)

$\Delta ABC \sim \Delta DEF$

$\angle A = 47°$, $\angle E = 83°$

∵ ΔABC and $\angle DEF$ are similar

∴ $\angle A = \angle D$, $\angle B = \angle E$ and $\angle C = \angle F$

$\angle A = 47°$

$\angle B = \angle E = 83°$

But $\angle A + \angle B + \angle C = 180°$

(Sum of angles of a triangle)

∴ $47° + 83° + \angle C = 180°$

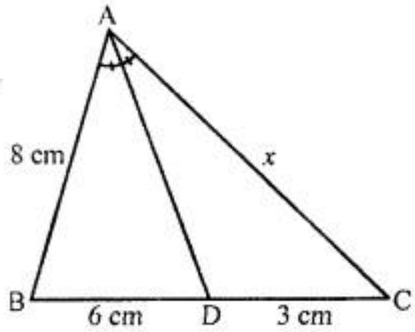
$\Rightarrow 130° + \angle C = 180° \Rightarrow \angle C = 180° - 130°$

$\Rightarrow \angle C = 50°$ (a).

5) Ans. (a)

In ΔABC, AD is the bisector of $\angle BAC$

AB = 8 cm, BD = 6 cm and DC = 3 cm



Let AC = x

$\because$ In ΔABC, AD is the bisector of $\angle A$

$\therefore \dfrac{AB}{AC} = \dfrac{BD}{DC} \Rightarrow \dfrac{8}{x} = \dfrac{6}{3}$

$\Rightarrow x = \dfrac{8 \times 3}{6} = 4$

$\therefore$ AC = 4 cm (a)

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

1) Ans.

$A(\Delta PQR) = \dfrac{1}{2}$ x QR x PS 1

$A(\Delta PQR) = \dfrac{1}{2}$ x PR x QT ....2 [Formula]

$\therefore \dfrac{1}{2}$ x PR x QT = $\dfrac{1}{2}$ x QR x PS

[From 1 and 2]

$\therefore$ 12 x QT = 6 x 6

$\therefore$ QT = $\dfrac{36}{12}$

$\therefore$ QT = 3 units

2) Ans. : In Δ ABC, DE || BC

$\therefore \dfrac{AD}{DB} = \dfrac{AE}{EC}$ ..... Basic proportionality theorem

$\therefore \dfrac{1.8}{5.4} = \dfrac{AE}{7.2}$

$\therefore AE \times 5.4 = 1.8 \times 7.2$

$\therefore AE = \dfrac{1.8 \times 7.2}{5.4} = 2.4$

AE = 2.4 cm

3) Ans. In Δ PRQ, seg RS bisects $\angle$ R.

$\frac{PR}{RQ} = \frac{PS}{SQ}$ . . . . . . property of angle bisector

$\frac{15}{20} = \frac{12}{SQ}$

$SQ = \frac{12 \times 20}{15}$

$\therefore \quad SQ = 16$

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

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. Let Δ_1 & Δ_2 be two similar triangles with s_1 & s_2 be their corresponding sides.

$A(\Delta_1) = \boxed{225\ cm^2}$, $A(\Delta_2) = 81\ cm^2$, $s^2 = 12$ cm [Given]

$\Delta_1 \sim \Delta_2$ [Given]

$\frac{A(\Delta_1)}{A(\Delta_2)} = \frac{\boxed{s_1^{\,2}}}{s_2^{\,2}}$

[Theorem on areas of similar triangles]

$\therefore \frac{\boxed{225}}{81} = \frac{s_1^{\,2}}{12^2}$

$\therefore \frac{\boxed{225} \times 12 \times 12}{81} = S_1^{\,2}$

$\therefore S_1 = \frac{15 \times 12}{9}$ [Taking square roots]

$\therefore S_1 = \boxed{20\ cm.}$

Length of corresponding side of bigger triangle is $\boxed{20\ cm}$.

5) Ans. seg AD ∥ seg BC [Given]

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

In ΔAPD & ΔCPB

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

(ii) $\angle APD \cong \angle CPB$ [Vertically opposite angles]

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

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

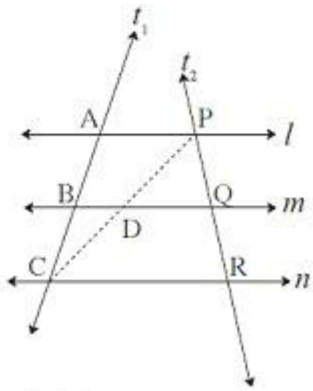
$\therefore \frac{AP}{PD} = \frac{CP}{PB}$ [Alternando]

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

Q.6 Solve the following questions (ANY FIVE) 15

1) Ans. **Given :** line l ∥ line m ∥ line n

t_1 and t_2 are transversals. Transversal t_1 intersects the lines in points A, B, C and t_2 intersects the lines in points P, Q, R.



To prove : $\frac{AB}{BC} = \frac{PQ}{QR}$

Proof : Draw seg PC , which intersects line m at point D.

In Δ ACP, BD ∥ AP

$\therefore \frac{AB}{BC} = \frac{PD}{DC}$. . . . . (I) (Basic proportionality theorem)

In Δ CPR, DQ ∥ CR

$\therefore \frac{PD}{DC} = \frac{PQ}{QR}$. . . . . (II) (Basic proportionality theorem)

$\therefore \frac{AB}{BC} = \frac{PD}{DC} = \frac{PQ}{QR}$. . . . . from (I) and (II). $\therefore \frac{AB}{BC} = \frac{PQ}{QR}$

2) Ans.

(i) $\frac{PQ}{PR} = \frac{7}{3}$ 1

$\frac{QM}{RM} = \frac{3.5}{1.5} = \frac{35}{15} = \frac{7}{3}$ 2

In ΔPQR, $\frac{PQ}{PR} = \frac{QM}{RM}$ [From 1 & 2]

$\therefore$ Ray PM bisects $\angle QPR$.

(ii) $\frac{PQ}{PR} = \frac{10}{7}$ 1

$\frac{QM}{RM} = \frac{8}{6} = \frac{4}{3}$ 2

In ΔPQR, $\frac{PQ}{PR} \neq \frac{QM}{RM}$

$\therefore$ Ray PM does not bisect $\angle QPR$.

(iii) $\frac{PQ}{PR} = \frac{9}{10}$ 1

$\frac{QM}{RM} = \frac{3.6}{4} = \frac{36}{40} = \frac{9}{10}$ 2

In Δ PQR, $\frac{PQ}{PR} = \frac{QM}{RM}$ [From 1 & 2]

$\therefore$ Ray PM bisects $\angle QPR$.

3) Ans.

In ΔXDE, PQ ∥ DE .... Given

$\therefore \frac{XP}{PD} = \frac{XQ}{QE}$

.... (I) (Basic proportionality theorem)

In ΔXEF, QR ∥ EF .... Given

$\therefore \frac{XQ}{QE} = \frac{XR}{RF}$ .... (II) B.P.T.

$\therefore \frac{XQ}{QE} = \frac{XR}{RF}$ ...... from (I) and (II)

$\therefore$ seg PR ∥ seg DE
.... (Converse of basic proportionality theorem)

4) Ans. AR = 5AP [Given]

$\therefore \frac{AR}{AP} = \frac{5}{1}$ 1

Seg PQ ∥ seg RS [Given]

$\therefore \angle ASR \cong \angle AQP$

...... 2 [Alternate angles theorem]

In ΔSAR and ΔQAP

(i) $\angle ASR \cong \angle AQP$ [From 2]

(ii) $\angle SAR \cong \angle QAP$

[Vertically opposite angles]

$\therefore \Delta SAR \sim \Delta QAP$ [AA test]

$\therefore \frac{SR}{QP} = \frac{AR}{AP}$ [c.s.s.t]

$\therefore \frac{SR}{QP} = \frac{5}{1}$ [From 1]

$\therefore SR = 5QP$

i.e. SR = 5 PQ

5) Ans. ΔABC & ΔDEF are equilateral triangles.

Equilateral triangles are always similar.

$\therefore \Delta ABC \sim \Delta DEF$

$\frac{A(\Delta ABC)}{A(\Delta DEF)} = \frac{AB^2}{DE^2}$

[Theorem on areas of similar triangles]

$\therefore \frac{1}{2} = \frac{4^2}{DE^2}$

$\therefore DE^2 = 16 \times 2$

$\therefore DE = 4\sqrt{2}$ cm

6) Ans. $A(\Delta PQF) = 20$ units, PF = 2 DP, Let us assume DP = x. ∴ PF = 2x

DF = DP + [PF] = [x] + [2x]

= 3x

In Δ FDE $\cong$ Δ FPQ,

$\angle FDE \cong \angle FPQ$ corresponding angles

$\angle FED \cong \angle FQP$ corresponding angles

$\therefore \Delta FDE \sim \Delta FPQ$ ...... AA test

$\therefore \frac{A(\Delta FDE)}{A(\Delta FPQ)} = \frac{\boxed{DF^2}}{\boxed{PF^2}} = \frac{(3x)^2}{(2x)^2} = \frac{9}{4}$

$A(\Delta FDE) = \frac{9}{4} A(\Delta FPQ) = \frac{9}{4} \times \boxed{20} = \boxed{45}$ sq. units

A(□ DPQE) = A(ΔFDE) – A(Δ FPQ)

= [45] - [20]

= [25]