Entire Syllabus

Q.1 (A)

(i) c) 5

(ii) b) $\frac{DE}{PQ} = \frac{EF}{RP}$

(iii) a) 2

(iv) b) 0

(B)

i) $\sin 60 = \frac{AB}{14}$

$\frac{\sqrt{3}}{2} = \frac{AB}{14}$

$AB = 7\sqrt{3}$

(ii) Area of circle = Area of minor sector + Area of major sector

314 = 100 + Area of major sector

Area of major sector = 214 cm^2.

(iii) $\frac{A(\Delta DEF)}{A(\Delta MNK)} = \frac{DE^2}{MN^2} = \frac{5^2}{6^2} = \frac{25}{36}$

(iv) $\sec\theta = \frac{2}{\sqrt{3}}$

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

$\cos\theta = \cos 30.$

$\theta = 30 = \frac{\pi}{6}$

Q.2 (A)

(i) $\boxed{60}$

$\boxed{90}$

$\boxed{150}$

$\boxed{30}$

(ii) $\boxed{2}$

$\boxed{2}$

$\boxed{2}$

(iii) $\boxed{\text{Property of angle bisector of a triangle}}$

$\boxed{\dfrac{AE}{EB}}$

$\boxed{\dfrac{AD}{DC}}$

$\boxed{\text{mid-point theorem}}$

(B)

(i) If ΔACB

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

$AC = \sqrt{144 + 1225}$

$AC = \sqrt{1369}$

$AC = 37$

(ii) Vol. of cone $= \dfrac{1}{3}\pi r^2 h$

$= \dfrac{1}{3}\pi \times 1.5 \times 1.5 \times 5$

$= 3.75\ \pi\ cm^3$

(iii) $M = (-5, -2)$

$N = (2, 2)$

Let L (0, y) be a point on y-axis

$LM = \sqrt{(0+5)^2 + (y+2)^2}$

$= \sqrt{25 + y^2 + 4 + 4y}$

$LM = \sqrt{y^2 + 29 + 4y}$

$LN = \sqrt{(0-3)^2 + (y-2)^2}$

$= \sqrt{0 + y^2 + 4 - 4y}$

$LN = \sqrt{y^2 + 13 - 4y}$

$LM = LN$

$LM^2 = LN^2$.

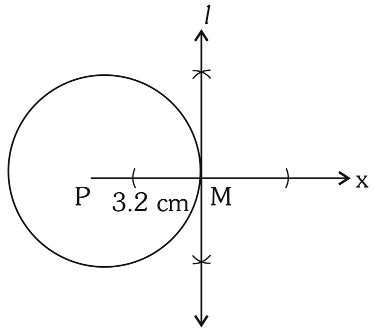
$y^2 + 29 + 4y = y^2 + 13 - 4y$

$16 = -8y$

$y = -2$

Hence, (0, – 2) is the point on y-axis.

(iv)



Step of construction :

i. Draw a circle with center P and radius 3.2 cm.

ii. Take any point M on the circle.

iii. Draw ray PM.

iv. Draw line *l* perpendicular to ray PX through point M.

(v) a. AB = OA = OB

Hence OAB will be an equilateral triangle.

Hence $\angle AOB = 60^0$.

b. $\angle ACB = \frac{1}{2}\angle AOB$

$= \frac{1}{2} \times 60$

$\angle ACB = 30^0$.

Q.3 (A) Complete the following activities (Any one) **03**

(i) $\boxed{\frac{XQ}{QE}}$ $\boxed{\text{Proportionality theorem}}$

$\boxed{\frac{XQ}{QE}}$

$\boxed{\frac{XP}{PD}} = \boxed{\frac{XR}{RF}}$

$\boxed{\text{By converse of Basic proportionality theorem}}$

(ii) $\boxed{\frac{d-b}{c-a}}$

$\boxed{3}$

$\boxed{DC}$

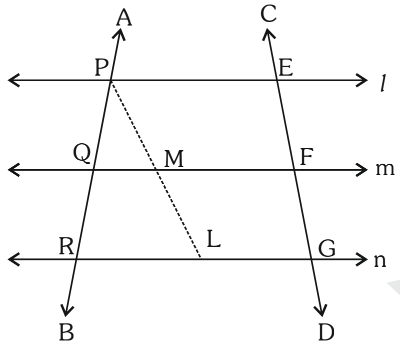
$\boxed{AD}$

$\boxed{\text{Parallelogram}}$

(B)

(i) Given : $l \parallel m \parallel n$

AB, CD are transversal



To prove : $\dfrac{PQ}{QR} = \dfrac{EF}{FG}$

Construction : PL || EG

PE || MF — PM = EF

MF || LG — ML = FG

QM || RL — (Basic proportionality theorem)

$\dfrac{PQ}{QR} = \dfrac{PM}{ML}$ .... (i)

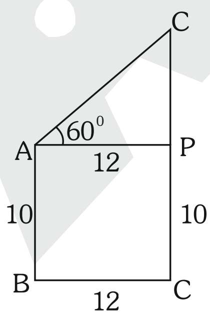
$\dfrac{PQ}{QR} = \dfrac{EF}{FG}$ .... (ii)

From (i) and (ii)

$\dfrac{PM}{ML} = \dfrac{EF}{FG} = \dfrac{PQ}{QR}$

$\dfrac{PQ}{QR} = \dfrac{EF}{FG}$

(ii) Let AB and CD be two building with AB = 10 m and angle of elevation from top of AB to top of CD



$\angle CAP = 60^0$.

Width of road = BD = 12 m

AB = PD = 10

BD = AP = 12

APC is a right angled triangle

in ΔAPC

$$\tan\theta = \frac{CP}{AP}$$

$$\tan 60 = \frac{CP}{12}$$

$$\sqrt{3} = \frac{CP}{12}$$

$$CP = 12\sqrt{3}$$

CD = CP + PD

$$= \left(12\sqrt{3} + 10\right) m$$

(iii) From the centre O of smaller circle, draw seg OT $\perp$ PR. Join OP, OR and seg MN.

Proof : Quadrilateral RMNP is a cyclic quadrilateral.

$\angle MRP = \angle MNQ$

also quadrilateral MNQS is a cyclic quadrilateral

$\angle MNQ + \angle P = 180^0$.

$\angle MNQ = \angle MSQ$

Hence,

$\angle MRP = \angle MSQ$

But they are a pair of interior angle on the same side of transversal SR

Hence, SQ || RP.

(iv) Diagonal of perallelogram bisect each other.

e.g. midpoint PR = midpoint QS

$$\left\{\frac{2+11}{2}, \frac{(-2-1)}{2}\right\} = \left\{\frac{(7+6)}{2}, \frac{(3-6)}{2}\right\}$$

$$\left\{\frac{13}{2}, \frac{-3}{2}\right\} = \left\{\frac{13}{2}, \frac{-3}{2}\right\}$$

Midpoint of PR = Midpoint of QS

So, PQRS is a parallelogram.

Q.4

i. Given ΔABC, GE || AB and GF || AC

Construction : Draw a median AD.

Since G is the centroid

we know $\frac{GD}{AD} = \frac{1}{3}$ (centroid divide the median in 1 : 2 ratio)

$$\frac{A(\Delta GEF)}{A(\Delta ABC)} = \frac{GD^2}{AD^2} = \frac{1}{9}$$

ii. $\angle B = 45$

$\angle A = 100$

$\angle C = 35$

Step 1 : Draw a line segment BC = 6

Step 2 : Draw an angle 45 at B on BC

Step 3 : Draw an angle of 35 at C on BC.

Using perotector such that, it intersect angle drawn in step 2 at A.

ΔABC is constructed.

to construct, ΔPBQ whose sides are 4/7 times the corresponding of ΔABC

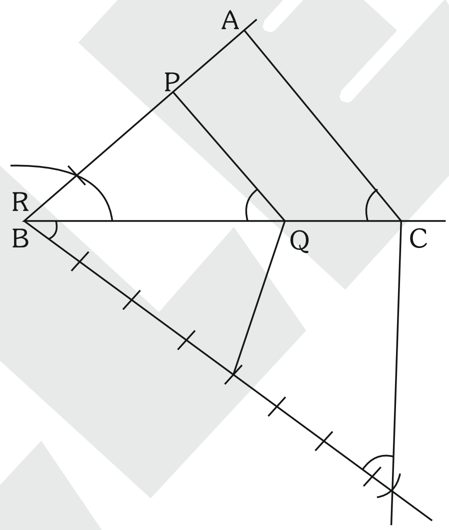
Draw an acute angle at BC

Using compass take 7 equal distant point.

Join 7th point with C

draw a parallel line (through 4th point) to line passing through 7th point intersecting BC at C'

ΔPBQ in 4/7 times $\angle ABC$.



iii. $\angle SPQ = \frac{1}{2} m(\text{arc } PR)$

$\angle SQR = \frac{1}{2} m(\text{arc } PQ)$ (Inscribed angle)

$\angle PSQ + \angle PQS + \angle SQP = 180^0$.

$\angle SQR = \frac{1}{2} m \text{ arc } SRQ$

$\angle SPQ = \frac{1}{2} m \text{ arc } SRP$

But,

$\angle PSQ = \frac{1}{2} \angle PRQ$

arc PR + arc RQ = 180^0.

also,

$\angle PRQ + \angle PSQ = 180^0$.

Q.5

i. Construction : Join CG

Proof : Let $\angle ABC = x$

then $\angle ADC$ will be $180 - x^0$.

$\angle CGF = x^0$ .... (i)

$\angle EDC = x^0$

So, $\angle EGC = 180 - x$ .... (ii)

add (i) and (ii)

$\angle CGF + \angle EGC = x + 180 - x = 180^0$.

Line GFE is a straight line

So point G will be on the line EF.

ii. Equilateral triangle field each angle is 60^0.

$r = 6$ m

Area of sector of a circle

$$= \frac{\theta}{360} \times \pi r^2$$

Area of sector $= \frac{60}{360} \times \frac{22}{7} \times 6 \times 6$

$= 18.8$ m^2.

Square field

area of sector

$$= \frac{90}{360} \times \frac{22}{7} \times 6 \times 6$$

$= 28.2$ m^2.

Hexagonal field

area of sector

$$= \frac{120}{360} \times \frac{22}{7} \times 6 \times 6$$

$= 37.7$ m^2.

Now, when we compare the areas the hexagonal field has a larger are compared to the equilateral triangle and square field. Therefore, the row is able to graze maximum area in a hexagonal field so it should be tied in the hexagonal field.