

Formulas of Unit 6:- Ex 6.2

$$\textcircled{1} \quad L = r\theta$$

$$\textcircled{2} \quad A = \frac{r^2\theta}{2}$$

$$\textcircled{3} \quad \theta = \frac{L}{r}$$

$$\textcircled{4} \quad r = \frac{L}{\theta}$$

$$\textcircled{5} \quad d = s \times t$$

20-9-2024

Math

Unit 6

Ex 6.2

Q1) i) $r = 5 \text{ cm}$

$\theta = \frac{\pi}{3} \text{ radians}$

$L = r\theta$

$A = \frac{r^2\theta}{2}$

$L = 5 \times \frac{\pi}{3}$

$A = \frac{(5)^2 \times \pi}{2}$

$L = 5 \times (3.1416)$

$A = \frac{5 \times 5 \times \pi}{2 \times 3}$

$L = 5.236$

$A = \frac{5 \times 5 \times 3.1416}{2 \times 3}$

$L = 5.24 \text{ cm}$

$A = 13.09 \text{ cm}^2$

Q2 ii

$r = 12 \text{ cm}$, $\theta = 120^\circ$

$\theta = 120 \times \frac{\pi}{180} \text{ rad}$

$L = r\theta$

$\frac{2\pi \text{ rad.}}{3}$

$L = 12 \times \frac{2\pi}{3}$

$A = \frac{r^2\theta}{2}$

$L = 12 \times 2 \times 3.1416$

$A = \frac{12 \times 12 \times 2 \times 3.1416}{2 \times 3}$

$L = 25.13 \text{ cm}$

$A = 150.780 \text{ m}^2$

iii) $r = 6 \text{ dm}$, $\theta = 60^\circ 45' 30''$

$r = 6 \text{ dm}$, 1.06 rad

$L = ?$

$A = ?$

$L = r\theta$

$A = \frac{r^2\theta}{2}$

$L = 6 \times (1.06)$

2

$L = 6.36 \text{ dm}$

$A = \frac{6 \times 6 \times 1.06}{2}$

2

$A = 19.08 \text{ dm}^2$

For first we convert in degree

$60^\circ + (45 \times \frac{\pi}{180}) + (30 \times \frac{\pi}{3600})$

$60^\circ + 0.75^\circ + 0.008^\circ$

60.7583°

$60.7583 \times \pi$

180

60.7583×3.1416

180

1.06 rad

Q2 $r = 4 \text{ cm}$, $\theta = 75^\circ$
 $r = 4 \text{ cm}$, $\theta = 1.309 \text{ rad}$

$\frac{75 \times \pi}{180}$ $\frac{75 \times \pi}{180} \text{ rad}$

$L = ?$

$A = ?$

$75 \times 3.1416 \text{ rad}$

180

$L = r\theta$

$A = \frac{r^2\theta}{2}$

$L = 4 \times 1.309$

$A = \frac{4 \times 4 \times 1.309}{2}$

$= 1.309 \text{ rad}$

$L = 5.24 \text{ cm}$

2

$A = 10.47 \text{ cm}^2$

Q3 i) $\theta = ?$

$L = 8 \text{ cm}$, $r = 4 \text{ cm}$

$L = r\theta$

$8 = 4 \times \theta$

$\theta = \frac{8}{4}$

$\theta = 2$

$\theta = 2 \text{ rad Ans}$

ii) $A = 45 \text{ cm}^2$, $r = 10.70 \text{ cm}$, $\theta = ?$

$A = \frac{r^2\theta}{2}$

2

$45 = \frac{10.70 \times 10.70 \times \theta}{2}$

2

$45 \times 2 = 10.70 \times 10.70 \times \theta$

10.70×10.70

$\theta = \frac{90}{119.49}$

119.49

$\theta = 0.75 \text{ rad Ans}$

i) $L = 8.5 \text{ m}$, $r = 2.25 \text{ m}$, $\theta = ?$

$L = r\theta$

$\theta = \frac{8.5}{2.25}$

$\frac{8.5}{2.25} = \theta$

$3.78 = \theta$

3.78

$$iv) 100 \text{ cm}^2 \quad A = 100 \text{ cm}^2, \quad L = 10 \text{ cm} \quad \theta = ?$$

$$A = \frac{r^2 \theta}{2}$$

$$L = r\theta$$

$$\frac{L}{\theta} = r$$

$$A = \frac{L \times r \theta}{2}$$

$$\therefore r = \frac{L}{\theta}$$

$$A = \frac{L \times r \theta}{\theta \times 2}$$

$$\therefore L = r\theta$$

$$A = \frac{L \times L}{\theta \times 2}$$

$$100 = \frac{10 \times 10^5}{\theta \times 2}$$

$$\frac{100 \times 2}{\theta} = 50$$

$$\theta = \frac{50}{100}$$

$$\theta = 0.5 \text{ rad}$$

Q4 i) $r = ?$, $L = 4 \text{ cm}$, $\theta = \pi \text{ rad}$.

$$L = r\theta$$

$$4 = r \times \pi$$

$$4 = r$$

$$3.1416$$

$$1.22 = r$$

$$r = 1.22 \text{ cm}$$

ii) $r = ?$, $L = 6 \text{ m}$, $\theta = 15^\circ$ • ~~$15 \times \pi$~~ $\frac{15 \times \pi}{180} = \frac{15 \times 3.1416}{180}$

$$L = r\theta$$

$$6 = r$$

$$0.2618$$

$$r = 22.91892 \text{ m}$$

iii) $A = 200 \text{ cm}^2$, $\theta = \pi \text{ rad}$, $r = ?$

$$A = \frac{r^2 \theta}{2}$$

$$200 = \frac{r^2 \times \pi}{2 \times 4}$$

$$200 \times 2 \times 4 = r^2 \times \pi$$

$$3.1416$$

$$r^2 = 509.29$$

Taking squaroot on b/s

$$\sqrt{r^2} = \sqrt{509.29}$$

$$r = 22.567 \text{ cm}$$

iv) $A = 100 \text{ dm}^2$, $L = 10 \text{ dm}$, $r = ?$

$$A = \frac{r^2 \theta}{2}, \quad L = r\theta$$

$$\frac{A \times r \times \theta}{2} = \frac{A \times r \times L}{2}$$

$$\frac{A \times L \times r \theta}{\theta \times 2} = 100 = \frac{r \times 10 \times 5}{2}$$

$$\frac{A \times L \times L}{\theta \times 2}$$

$$100 = r \times 5$$

$$200 = r$$

$$r = 20 \text{ dm}$$

$$r = 20 \text{ dm}$$

$$v) r = 30 \text{ inches}, \theta = 30^\circ, L = ?$$

$$L = r\theta$$

$$L = 30 \times 0.5236$$

$$L = 15.71 \text{ inches Ans}$$

$$\frac{30 \times \pi}{180}$$

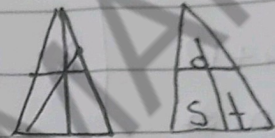
$$\frac{30 \times 3.1416}{180}$$

$$0.5236 \text{ rad}$$

$$Q6 \quad r = 10 \text{ km} \quad \theta = ?$$

$$\text{Speed} = 42 \text{ km/h}, \text{ time} = 21 \text{ min.}$$

$$\frac{21}{60} = h$$



$$d = s \times t$$

$$d = 42 \times \frac{21}{60}$$

$$L = d = 14.7 \text{ km}$$

$$L = r\theta$$

$$14.7 = 10\theta$$

$$\frac{14.7}{10} = \theta$$

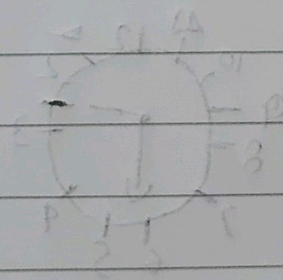
$$\theta = 1.47 \text{ rad}$$

$$\theta = 1.47 \times \frac{180}{\pi}$$

$$\theta = \left(\frac{1.47 \times 180}{3.1416} \right)^\circ$$

$$\theta = 84.22^\circ$$

$$\theta = 84^\circ \text{ Ans}$$



Q7 $d = 12 \text{ cm}$

$r = 6 \text{ cm}$

$\theta = 480^\circ \quad \alpha = \pi$

$\alpha = 180^\circ \times \frac{\pi}{180}$
 $\alpha = \pi$

$L = r\alpha$

$L = 6 \times 3.1416$

$L = 18.854$

$P = L + d$

$P = 18.85 + 12$

$P = 30.85 \text{ cm}$

$A = \frac{r^2 \alpha}{2}$

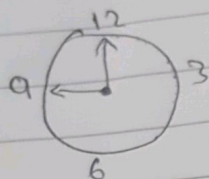
$A = \frac{6^2 \times 3.1416}{2}$

$A = 56.55$

$A = 56.55$

$A = 56.55$

Q8 i) 9 o'clock



3 parts = 3×30

$= 90^\circ$

Total angle = 360°

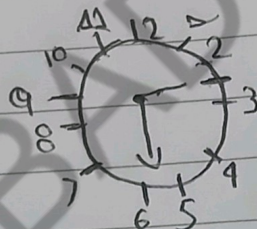
Total parts = 12

$= 90^\circ \times \frac{\pi}{180}$

one part or hour = $\frac{360^\circ}{12} = 30^\circ$

$\frac{\pi}{2} \text{ rad}$

ii) 02:30



3.5 parts = 3.5×30

$= 105^\circ$

$= 105 \times \frac{\pi}{180}$

$\frac{7\pi}{12} \text{ rad}$

iii) 06:45

2 parts = 2×30

$= 60^\circ$

2 parts + $\frac{1}{4}$ parts = $60 + 7.5$

$= 67.5^\circ \times \frac{\pi}{180}$

$= \frac{3\pi}{8} \text{ rad Ans}$

