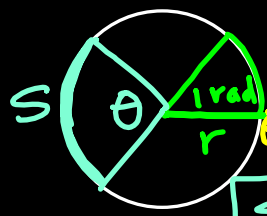
Arc Length

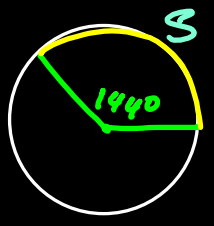
in
ft
m
Km



$\frac{S}{\theta} = \frac{r\theta}{1 \text{ rad}}$

$S = r\theta$

Deg-Rad



$S = r\theta$

$S = 120 \cdot \frac{14\pi}{180}$

$r = 120$ mm

$= 302$

≈ 300 mm

Grand Portage, MN 44° N

New Orleans, LA 30° N

Distance between cities?

$r = 6400$ Km

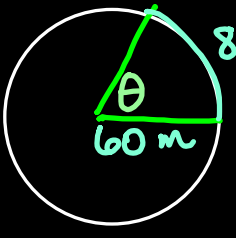
$S = r\theta$

$S = 6400\left(\frac{14\pi}{180}\right)$

$S = 1564$

≈ 1600 Km

Find θ in deg.



$S = r\theta$

$84 = 60\theta$

$\frac{84}{60} = \theta$

$1.4 \text{ rad} = \theta$

$1.4 \text{ rad} \cdot \frac{180^\circ}{\pi \text{ rad}}$

≈ 80.21

$\approx$ 80 m

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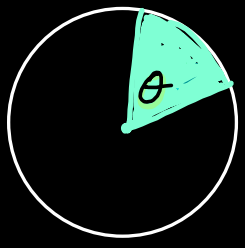
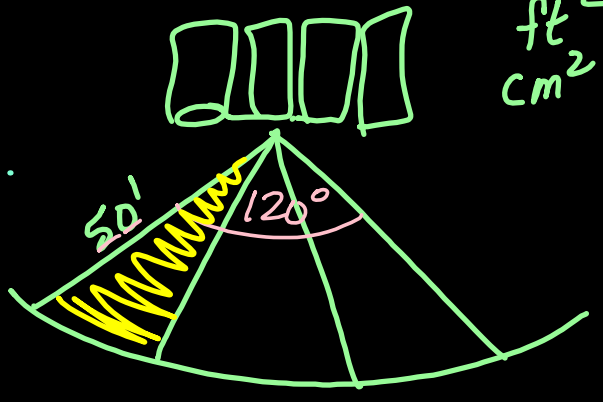
Area of Sector



$$\frac{\theta}{360} = \frac{\theta}{2\pi}$$

$$A = \frac{\theta}{2\pi} \cdot \pi r^2 = \frac{1}{2}\theta r^2$$

m^2
ft^2
cm^2



$$A = \frac{1}{2}\theta r^2$$
$$= \frac{1}{2} \cdot \frac{40\pi}{180} \cdot 50^2$$
$$= 873 \approx 870\ ft^2$$

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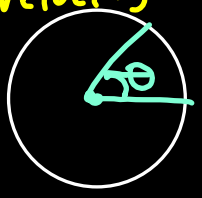
Angular & Linear Velocity

Angular Velocity

$\omega = \frac{\theta}{t}$

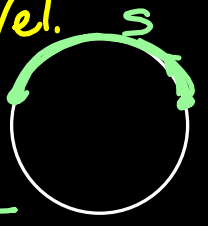


ω

$\frac{rad}{sec}, \frac{rad}{min}$

Leave π in answer

Linear Vel.



$\frac{ft}{sec}, \frac{mi}{h}$

$\frac{cm}{mn}$

$$V = \frac{s}{t}$$
$$= \frac{r\theta}{t}$$
$$= r\omega$$

A merry-go-round has 6' radius & is turning at 10 $\frac{rev}{min}$. How fast is a child on the edge moving in ft/sec?

$V = \frac{s}{t} = \frac{r\theta}{t} = r\omega$

1 rev = 2π rad.

$V = \frac{6\ ft \cdot 10 \cdot 2\pi}{1\ min} = 377\ \frac{ft}{min}$

$= 377\ \frac{ft}{min} \cdot \frac{1\ min}{60\ sec} = 6.3 \approx 6\ \frac{ft}{sec}$

Top spinning at 85 $\frac{rev}{sec}$. What is its angular velocity?

$\omega = \frac{\theta}{t} = \frac{85 \cdot 2\pi}{1\ sec} = 170\pi\ \frac{rad}{sec}$

Diam = 4 in r = 2 in $V = 2\ in \cdot 170\pi\ \frac{rad}{sec} = 340\pi\ \frac{in}{sec}$

Find linear vel.

$340\pi\ \frac{in}{sec} \cdot \frac{3600\ sec}{1\ hr} \cdot \frac{1\ ft}{12\ in} \cdot \frac{1\ mi}{5280\ ft}$

$= \frac{340\pi \cdot 3600}{12 \cdot 5280} = 60.7\ \frac{mi}{h}$

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