4.1 day 2

I. Decimal Degrees versus DMS (degrees, minutes, seconds)
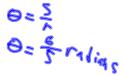
Ex 1) 85°18'30" $= 85.308\overline{3}$

Ex 2) -124°30' $= -124.5$

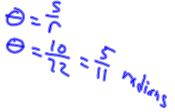Ex 3) 310.75° $= 310°45'0''$

II. Finding the arc length and radian measure: $\theta = s/r$ $\theta = \dfrac{s}{r}$

$\overset{arc\ length}{\underset{central\ angle}{\theta}} \quad \overset{}{\underset{radius}{}}$

Ex 4) Find the angle in radians.

$\theta = \dfrac{s}{r}$

$\theta = \dfrac{6}{5} \text{ radians}$

Ex 5) Find the radian measure of the central angle of a circle with r = 22 feet and arc length of 10.

$\theta = \dfrac{s}{r}$

$\theta = \dfrac{10}{22} = \dfrac{5}{11} \text{ radians}$

Ex 6) Find the arc length of a circle with r = 14 inches and central angle of 180°.

$r \cdot \theta = \dfrac{s}{\cancel{r}} \cdot \cancel{r}$ $180° = \pi \text{ radians}$

$s = r\theta$

$s = (14)\pi$

$\boxed{s = 14\pi} \text{ inches}$

III. Linear and Angular Speed

Linear Speed = $\dfrac{s}{t}$ How fast the particle moves

Angular Speed = $\dfrac{\theta}{t}$ How fast the angle changes

Ex 7) The second hand of a clock is 10.2 cm. Find the linear speed of the tip of the second hand.

$\theta = \dfrac{s}{r}$

$s = r\theta$

$s = 10.2(2\pi)$

$s = 20.4\pi \text{ cm}$

$L.S. = \dfrac{20.4\pi \text{ cm}}{60 \text{ sec.}}$

$L.S. = 1.068 \text{ cm/sec}$

10.2

Ex 8) A lawn roller with a 10 inch radius wheel makes 1.2 revolutions per second.

A) Find the angular speed in radians per second. $\dot{\theta} = \dfrac{s}{r}$

$A.S. = \dfrac{\theta}{t}$

roller turns $(1.2)(2\pi) = 2.4\pi \text{ radians/sec}$

B) Find the speed of the tractor that is pulling the roller.

$L.S. = \dfrac{s}{t} = \dfrac{r\theta}{t} = \dfrac{(10)(2.4\pi)}{1 \text{ sec.}} = \dfrac{24\pi \text{ in}}{1 \text{ sec}} = 6.283 \text{ ft/sec.}$