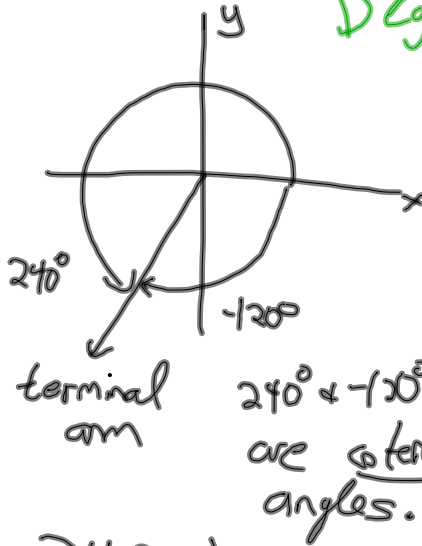


Angles

Degrees



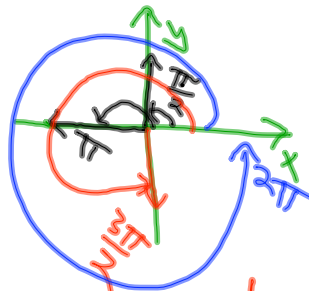
$$240^\circ + n360^\circ$$

$$n \in \mathbb{I}$$

forms a set of coterminal angles.

240° is the principal, the smallest positive coterminal angle.

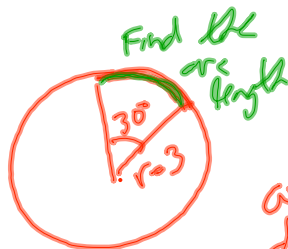
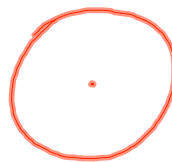
Radian measure $180^\circ = \pi$



$$90^\circ \times \frac{\pi}{180^\circ} = \frac{90\pi}{180} = \frac{\pi}{2}$$

Where do radians come from?

Circumference $C = 2\pi r$



$a = r\theta$
arc length distance around a circle

$$a = r\theta = (3) \left(\frac{\pi}{6} \right) = \frac{\pi}{2} \approx 1.57$$

$$30^\circ \times \frac{\pi}{180^\circ} = \frac{30\pi}{180} = \frac{\pi}{6}$$

15 cm minute hand. How far will
the tip of the hand travel in
80 minutes.



80 min

$$60 = 360^\circ$$

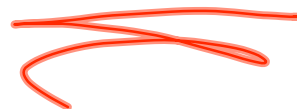
$$20 = 120^\circ$$

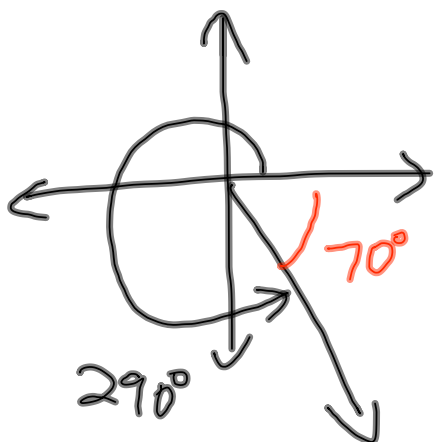
$$360^\circ = 2\pi$$

$$120^\circ = \frac{2}{3}\pi$$

$$(2\pi + \frac{2}{3}\pi) \times r$$

$$\approx 125.6 \text{ cm}$$





Reference angles

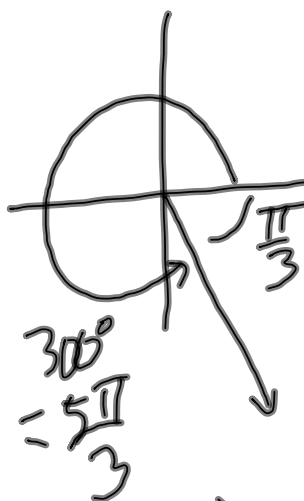
→ acute angles from a terminal arm to the nearest x axis.

Determine 3 terminal angles for $\frac{5\pi}{3}$ and sketch the position of the ³ terminal arm. What is the reference angle?

$$\frac{5(180^\circ)}{3} = 300^\circ$$

$$\frac{11\pi}{3}, \frac{17\pi}{3}, \frac{23\pi}{3} \checkmark$$

$$\frac{5\pi}{3} + 2\pi = \frac{5\pi}{3} + \frac{6\pi}{3}$$



$300^\circ, 60^\circ, 1120^\circ$
 ref angle 60°
 or $\frac{\pi}{3}$

1 radian = ? degrees

$$1 \text{ radian} \times \frac{180^\circ}{\pi \text{ rad}}$$

$$\approx 57.3^\circ$$

$$\pi \text{ radians} \approx 3 \text{ radians}$$

$$180 \text{ degrees}$$

p.190
4-54 evens



$$1 \text{ rad} \approx 60^\circ$$

$$\underline{1.2} \text{ rad} \approx 90^\circ$$