

## Degrees/Minutes/Seconds

VS

## Decimal Degrees

### 1. Convert to DMS

$$37.425^\circ$$

$$37^\circ 25' 30''$$

$$.425^\circ \left( \frac{60'}{1^\circ} \right) = 25.5$$

$$.5' \left( \frac{60''}{1'} \right) = 30$$

### 2. Convert to decimal degrees

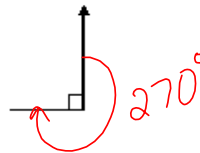
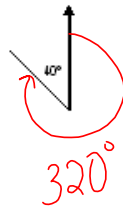
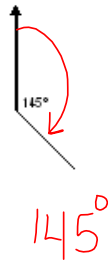
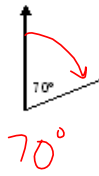
$$42^\circ 24' 36'' = 42.41^\circ$$

$$42^\circ + \left( \frac{24}{60} \right)^\circ + \left( \frac{36}{3600} \right)^\circ$$

How do we measure bearings?

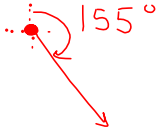
**\*\*Measured clockwise from the North\*\***

For each diagram write down the bearing represented.



## Draw a sketch

A fishing boat leaves Gloucester at a bearing of  $155^\circ$



An aircraft flying on a bearing of  $75^\circ$ .



A submarine traveling on a bearing of  $150^\circ$ .



A rocket travelling on a bearing of  $200^\circ$ .



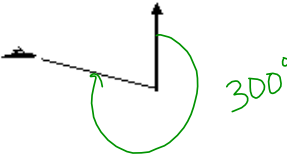
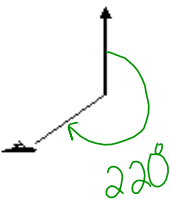
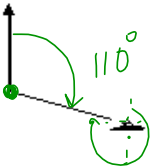
A car travelling on a bearing of  $48^\circ$ .



A helicopter flying on a bearing of  $310^\circ$ .

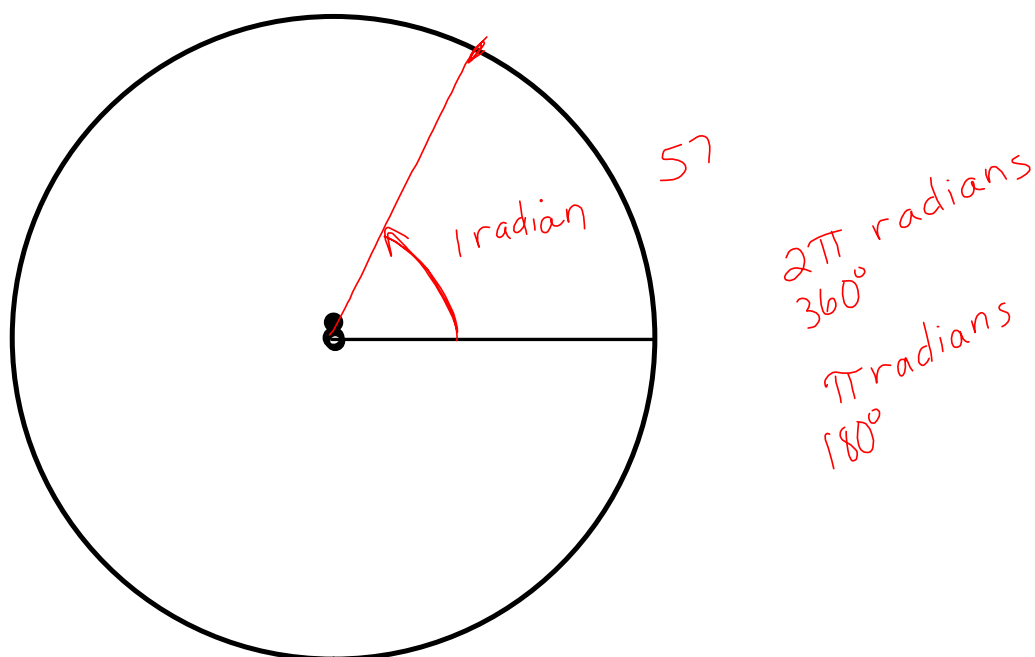


Estimate the bearings the ships are travelling on.



## What is a radian?

A central angle of a circle has measure 1 radian if it intercepts an arc with the same length as the radius.



## Converting between radians and degrees

**Key:**  $180^\circ = \pi$  radians

Convert to Radians

$$150^\circ \left( \frac{\pi}{180^\circ} \right) = \frac{150\cancel{\pi}}{180\cancel{6}} = \frac{5\pi}{6}$$

$75^\circ 30'$

$$75.5^\circ \left( \frac{\pi}{180^\circ} \right) = \frac{75.5\pi}{180} = \frac{151\pi}{360}$$

$$\approx 1.32$$

Convert to Degrees

$$\frac{3\cancel{\pi}}{4} \left( \frac{180^\circ}{\cancel{\pi}} \right) = 135^\circ$$

$$1.3 \left( \frac{180^\circ}{\pi} \right) \approx 74.5^\circ$$

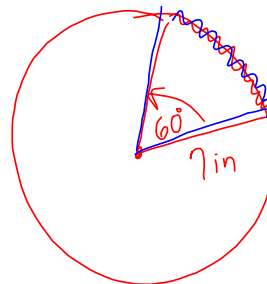
## Arc Length Formula (Radian Measure)

$$s = r\theta$$

radius  
 ↑  
 s = rθ ← central ∠  
 ↓  
 arc length  
 \*\*has to be in radians\*\*

Find the perimeter of a 60° slice of a large (7in. radius) pizza.

$$\begin{aligned} s &= r\theta \\ s &= 7\left(\frac{\pi}{3}\right) \\ s &\approx 7.33 \\ &+ 14.00 \\ \hline &21.33\text{in} \end{aligned}$$



$$60^\circ \left( \frac{\pi}{180^\circ} \right) = \frac{\pi}{3}$$

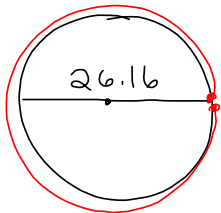
Convert from miles per hour to feet per second.

75 mph

$$75 \frac{\text{mi}}{\text{hr}} \left| \frac{5280 \text{ft}}{1 \text{mi}} \right| \frac{1 \text{hr}}{60 \text{min}} \left| \frac{1 \text{min}}{60 \text{sec}} \right| = 110 \frac{\text{ft}}{\text{Sec}}$$



Ford Taurus has a wheel diameter of 26.16 inches.  
 What is the speed in mph when the wheels are turning  
 at 800 revolutions per minute?



$$800 \frac{\cancel{\text{rev}}}{\cancel{\text{min}}} \left( \frac{82.18 \cancel{\text{in}}}{1 \cancel{\text{rev}}} \right) \left( \frac{1 \cancel{\text{ft}}}{12 \cancel{\text{in}}} \right) \left( \frac{1 \text{mi}}{5280 \cancel{\text{ft}}} \right) \left( \frac{60 \cancel{\text{min}}}{1 \text{hr}} \right) = 62.26 \frac{\text{mi}}{\text{hr}}$$

$$C = \pi d$$

$$C = \pi (26.16)$$

$$C = 82.18$$

1 statute mile  $\approx$  .87 nautical mile

1 nautical mile  $\approx$  1.15 statute mile

Assignment: Section 4.1

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EX: 1-31 odd, 39- 43, 45,  
47, 53, 58-62