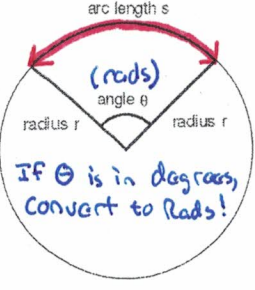
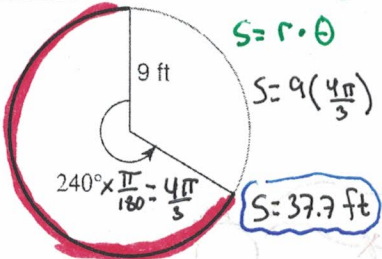
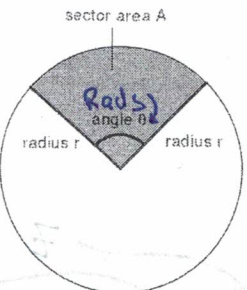
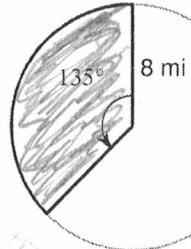
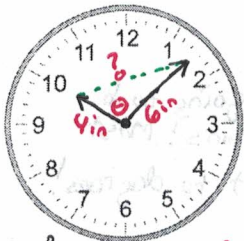


# 8.1 (Part II) – Applications with Angle Measure

Arc Length → $s = r \cdot \theta$ (in radians)	Sector Area → $A = \frac{1}{2} \cdot r^2 \cdot \theta$ (in radians)
 <p>arc length <math>s</math> radius <math>r</math> angle <math>\theta</math> (rads) IF <math>\theta</math> is in degrees, convert to Rads!</p> <p><b>Ex 1a: Find the arc length</b></p>  <p><math>S = r \cdot \theta</math> <math>S = 9 \left( \frac{4\pi}{3} \right)</math> <math>S = 37.7 \text{ ft}</math></p>	 <p>sector area <math>A</math> radius <math>r</math> angle <math>\theta</math> (rads)</p> <p><b>Ex 1b: Find the sector area</b></p>  <p><math>\textcircled{1} 135^\circ \cdot \frac{\pi}{180} = \frac{3\pi}{4}</math> <math>A = \frac{1}{2} r^2 \theta</math> <math>A = \frac{1}{2} (8)^2 \left( \frac{3\pi}{4} \right)</math> <math>A = 75.4 \text{ mi}^2</math></p>

**Example 2: Using the appropriate formula(s), find what is asked. Round to tenth place.**

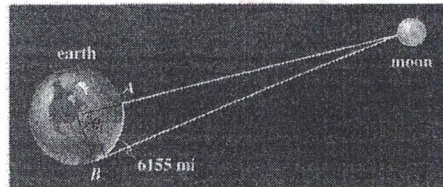
a.) What is the distance between the tips of the minute and the hour hand of a clock at 10:08 when the minute hand is 6 in long and the hour hand is 4 in long?



$S = r\theta$  ← Not asking for Arc length.  
SAS  $c^2 = a^2 + b^2 - 2ab \cos \theta$   
 $c^2 = (4)^2 + (6)^2 - 2(4)(6) \cos 108$   
 $c^2 = 66.83281573$   
 $C = 8.2 \text{ in}$

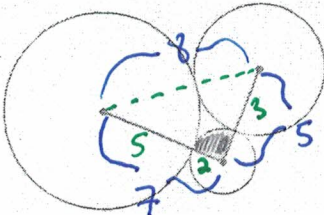
$360 \div 12 = 30^\circ$   
 $30 \div 5 = 6^\circ$   
 $\theta = 3(30) + 3(6)$   
 $\theta = 108^\circ$

b.) What is the distance between point A and the moon given the radius of the earth 3,960 miles?



\*SEE Backside\*

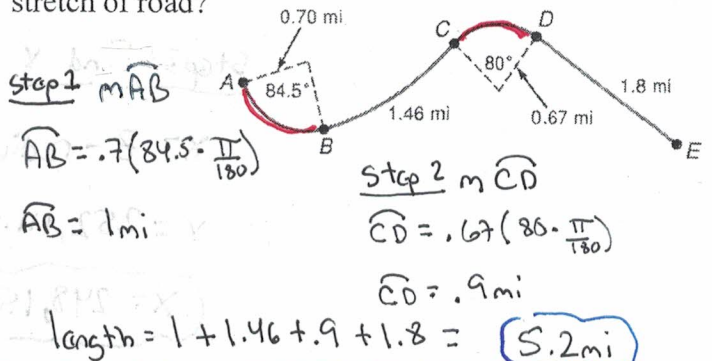
c.) Three circles with radii of 2, 3, and 5 inches respectively. What is the area of the shaded region?



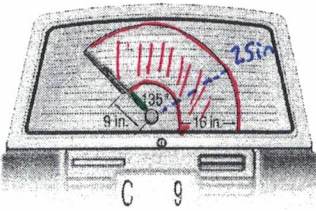
SSS Law of Cosines  
\* Find  $\theta$  first!  
 $(8)^2 = (7)^2 + (5)^2 - 2(7)(5) \cos \theta$   
 $64 = 74 - 70 \cos \theta$   
 $\theta = \cos^{-1}(1/7)$   
 $\theta = 81.8^\circ$   
 $\frac{409\pi}{900}$

$A = \frac{1}{2} r^2 \theta$   
 $A = \frac{1}{2} (2)^2 \left( \frac{409\pi}{900} \right)$   
 $A = 2.9 \text{ in}^2$

d.) The figure below shows a stretch of roadway where the curves are arcs of circles. What is the length of this stretch of road?



e.) What is the area swept by the rear windshield wiper?



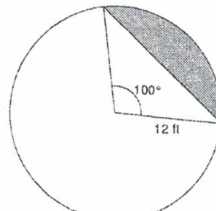
$\textcircled{2}$  Find Area of Entire  
 $A = \frac{1}{2} (25)^2 \left( \frac{3\pi}{4} \right)$   
 $A = 736.3 \text{ in}^2$

$\textcircled{3}$  Find Area of Unwiped  
 $A = \frac{1}{2} (9)^2 \left( \frac{3\pi}{4} \right)$   
 $A = 95.4 \text{ in}^2$

$\textcircled{4}$  Area Swept  
 $A = 736.3 - 95.4 = 640.9 \text{ in}^2$

$\textcircled{1}$  Convert  $\theta$  to Rads  
 $\theta = 135 \cdot \frac{\pi}{180}$   
 $\theta = \frac{3\pi}{4}$

f.) What is the area of the shaded region?

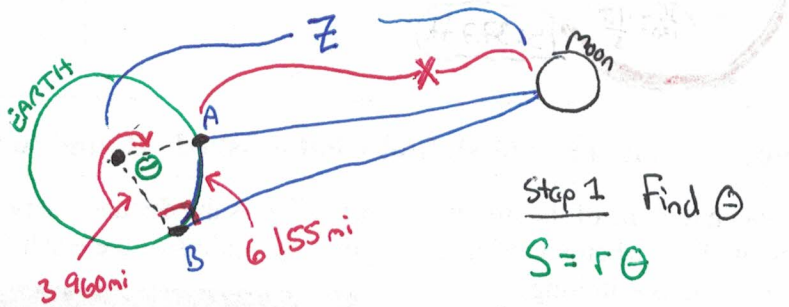


$\textcircled{2}$  Find Sector Area  
 $= \frac{1}{2} (12)^2 \left( \frac{5\pi}{9} \right)$   
 $= 125.7 \text{ Ft}^2$

$\textcircled{3}$  Find Area of  $\Delta$   
 $\frac{1}{2} ab \sin \theta$   
 $= \frac{1}{2} (12)(12) \sin 100$   
 $= 70.9 \text{ ft}$

$\textcircled{4}$  Area of Shaded Region  
 $125.7 - 70.9$   
 $54.8 \text{ Ft}^2$

$\textcircled{1}$  Convert to Rads  
 $\theta = 100^\circ \cdot \frac{\pi}{180}$   
 $\theta = \frac{5\pi}{9}$



Step 1 Find  $\theta$

$$S = r\theta$$

$$6155 = 3960\theta$$

$$\theta = \frac{6155}{3960}$$

← This is going to be in radians! Must convert to degrees!

$$\theta = \frac{6155}{3960} \cdot \frac{180}{\pi}$$

← Use  $\pi$  key

$$\theta = 89.1^\circ$$

Step 2 Find Z

$$\cos \theta = \frac{A}{H}$$

$$\cos 89.1 = \frac{3960}{Z}$$

$$Z = 252,111.8 \text{ mi}$$

Step 3 Find X

$$X = Z - \text{radius}$$

$$X = 252,111.8 - 3960$$

$$X = 248,151.8 \text{ mi}$$