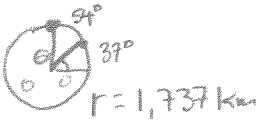
Name _____ Date _____

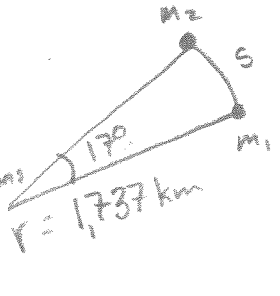
Math 112: #1 A/B

1. Suppose two moon cities have the same longitude and their latitudes are 37° and 54°. Assuming the radius of the moon is 1,737 *km*. Find the distance between the two cities as measured along the surface of the moon. State the exact answer, then give a decimal answer rounded to two decimal places.



$54^\circ - 37^\circ = 17^\circ = \theta$

$\theta = 17^\circ = \frac{17^\circ \pi}{180^\circ} = 0.094\pi$ radians



$S = r\theta = 1{,}737\text{ km} \cdot 0.094\pi \text{ radians}$

$S = 164.05\pi \text{ km}$

$\approx 515.38 \text{ km}$

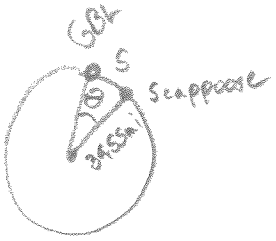
12′ 48′

2. Suppose two cities have the same longitude and their latitudes are 45.8° (Scappoose) and 65.2° (Great Bear Lake). Assuming the radius of the Earth is 3,955 *miles*, find the distance between the two cities as measured along the surface of the Earth. State the exact answer, then give a decimal answer rounded to two decimal places.

65.2 45.8

$\theta = 65\frac{12^\circ}{60} - 45\frac{48^\circ}{60} = 19\frac{36^\circ}{60} = 19.4^\circ$

$= \frac{19.4}{180} \cdot \pi$ radians



$S = r\theta = 3955\text{mi} \cdot \frac{19.4\pi}{180}$

$= 426.26\,\pi$ miles

$= 1339.14$ miles