Homework 3 Math 48C Mitchell Schoenbrun
8.3 P. 541 15-18, 37, 45, 50, 51, 54

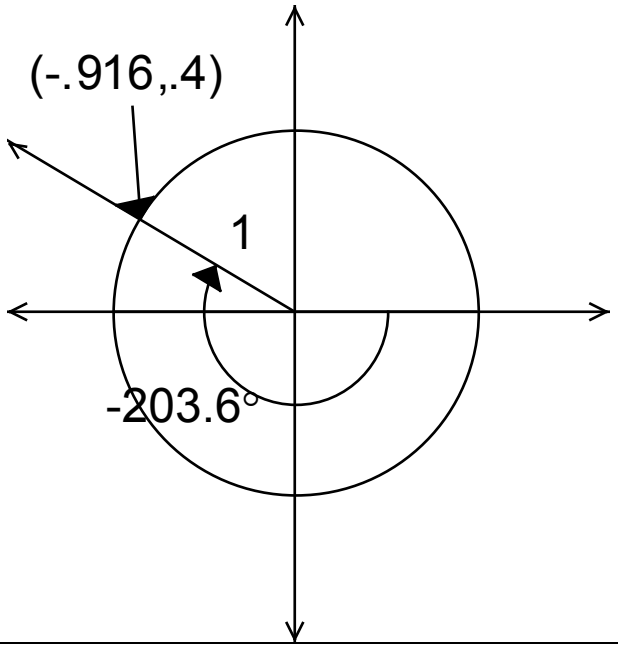
15) $.5\sin\left(537^\circ\right) \approx .0262$

$\sin\left(537^\circ\right) = \sin\left(537^\circ - 360^\circ\right) = \sin\left(177^\circ\right)$

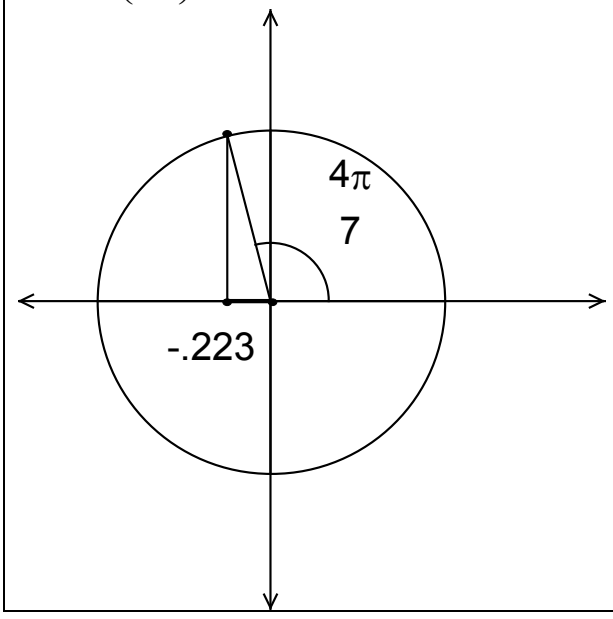
16)

$\left(\cos\left(-203.6^\circ\right), \sin\left(-203.6^\circ\right)\right) \approx$

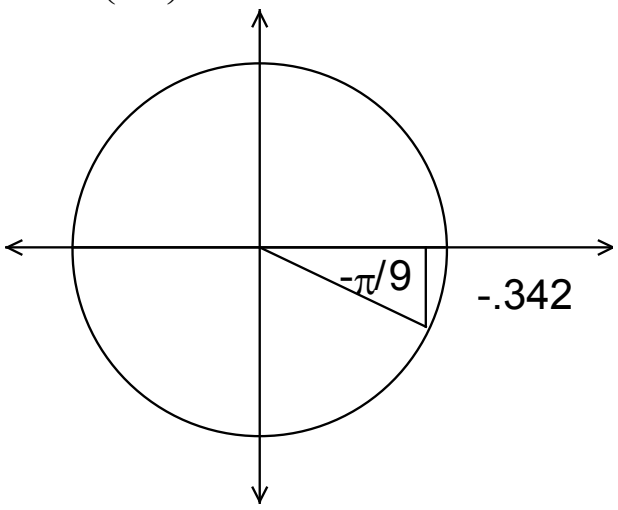
$\left(-.916, .4\right)$



17) $\cos\left(\frac{4\pi}{7}\right) \approx -.223$



18) $\sin\left(-\frac{\pi}{9}\right) \approx -.342$



37)

a) 53° is in quadrant I

180°-53°=127° is in quadrant II

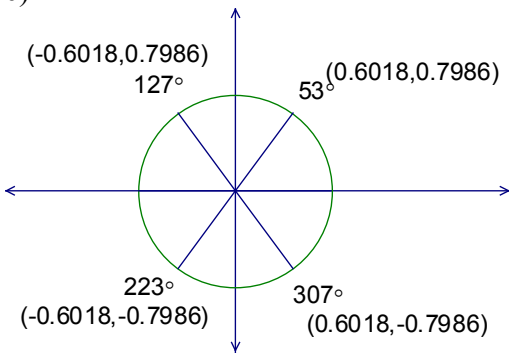
180°+53°=233° is in quadrant III

360°-53°=307° is in quadrant IV

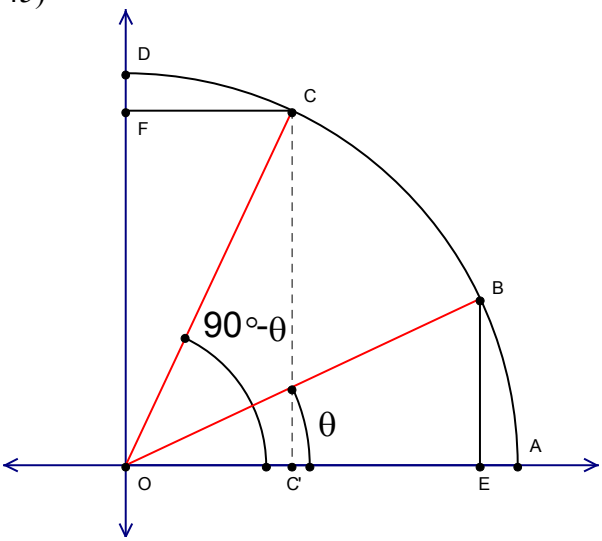
b)

Quadrant	sine	cosine
I	0.7986	0.6018
II	0.7986	-0.6018
III	-0.7986	-0.6018
IV	-0.7986	0.6018

c)



45)



Assume an angle ∠AOB

Construct ∠AOC such that it is complementary to ∠EOB

Since ∠OCD is complementary to ∠OAC it is congruent to ∠OAB

The hypoteni of right triangles ΔEBO and ΔFCO are both radii of the same circle and therefore congruent.

Triangles ΔEBO and ΔFCO are congruent by ASA

$\overline{BE} \simeq \overline{CF}$ and $\overline{OE} \simeq \overline{OF}$ are congruent by CPCTC

$$\frac{EB}{OB} = \frac{CF}{OC} = \frac{C'O}{OC}$$

$$\frac{EB}{OB} = \sin(\theta)$$

$$\frac{C'O}{OC} = \cos(90^\circ - \theta)$$

$$\sin(\theta) = \cos(90^\circ - \theta)$$

Note: I'm not expecting a Proof like this!

50) Possible answers:

1) In a right triangle a leg is always shorter than the hypotenuse so sines and cosines are always ≤ 1.

2) Sines and cosines are the coordinates of a point on a unit circle, so they must always be ≤ 1.

3) The range of the sine and cosine functions is [-1,1].

51) After traveling around the circle 2π radians the values will repeat. Both therefore have a period of 2π.

54) C = 2πR so the circumference of the Earth at the equator is $2\pi(3963mi) \approx 24900\ mi$