Homework 14

(due April 22
Math 130 *Kovitz* 2020

1. The radius of the earth is about 3959 miles.

   (a) Boston, Mass. and Columbus, Ohio are about 800 miles apart.
   Find the angle (in radians and in degrees) made by two rays from the center of the earth through these two cities.

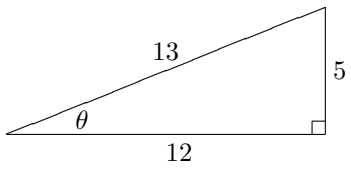
   (b) The distance from the UMass/Boston traffic circle to the Campus Center is about 1/3 mile.
   Find the angle in seconds made by two rays from the center of the earth through these two landmarks.
   (1 radian = $\frac{180}{\pi}$ = 57.29577951 degrees, and 1 degree = 3600 seconds.)

2. Two points on the surface of the Moon are 357.81 miles apart and the central angle to them equals 19° (nineteen degrees).
   Find the radius of the moon, rounded off to the nearest mile.

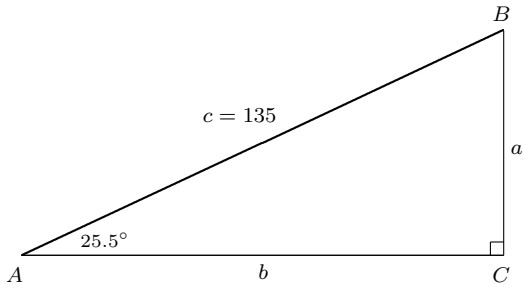
3. (a) Convert to radian measure: 6° (both in terms of π and as a decimal).
   (b) Convert to degree measure:
      i. $\frac{\pi}{8}$
      ii. 9
   Both of these numbers are in radian measure.
   (c) Convert to radian measure in terms of π: 9 radians. (First estimate.)

4. (a) How long is an arc associated with an angle of 1° in a circle with radius 1145.9156 feet?
   (b) The radius of the earth is about 3959 miles.
   How far apart are two points on the surface of the earth that make a central angle of 1° (1 deg.)? 1′ (1 min.)? [in feet] 0.01" ($\frac{1}{100}$ sec.)?

5. (a) In the unit circle, an arc 2.6 units long subtends a central angle of how many radians? Of how many degrees, to the nearest degree?
   (b) In a circle with 10-cm. radius, a 37 cm. arc subtends a central angle of how many radians? Of how many degrees, to the nearest degree?

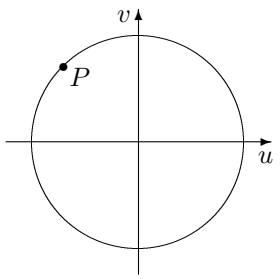


6. Find the six trigonometric ratios for angle θ. (The use of a calculator is permitted for the division only.)



7. Solve this triangle. (Find all sides and angles.)
   It is given that $\angle A = 25.5°$ and $c = 135$.

8. (a) On the unit circle mark the points determined by
      i. $\frac{3\pi}{8}$
      ii. $\frac{2\pi}{3}$
      iii. $-\frac{3\pi}{2}$
      iv. $-\frac{5\pi}{6}$



   (b) i. Find a real number between 0 and 2π that determines point P.
      ii. Find a real number between -2π and 0 that determines point P.
   (c) Is it a contradiction that P is determined by two different numbers?