Quiz 4 - Geometry

Math 1030 - Dylan Zwick's Class

Fall 2007

Name: Solutions

1. **Angles and Lines** (10 points)

   (a) Calculate the following angle conversions.

   Note 2π radians = $360°$.

   i. Convert $127°24'37''$ into decimal degree form. (3 points)

   $$127° + 24'\left(\frac{1°}{60'}\right) + 37''\left(\frac{1°}{60'}\right)\left(\frac{1'}{60''}\right)$$

   $$= \boxed{127.410°}$$

   ii. Convert .4376 radians into degree-minute-second form. (3 points)

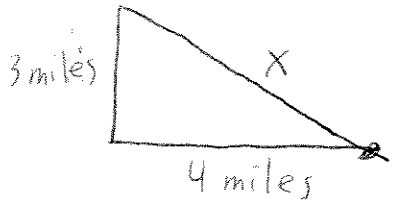
   $$(.4376 \text{ rad})\left(\frac{360°}{2\pi \text{ rad}}\right) = 25.0726°$$

   Converting to degree-minute-second form

   $$25° + (.0726)°\left(\frac{60'}{1°}\right) = 4.3580'$$

   $$= 4' + .3580'\left(\frac{60''}{1'}\right)^1 = 21.5'' \quad \text{So, } \boxed{25° 4' 21.5''}$$

(b) If you have to travel, from your starting point, 3 miles south and then 4 miles east to reach your destination, what is the straight line distance between your starting point and your destination? (4 points)
Hint - Draw a picture, and think triangles.



$x = \sqrt{(3 \text{ miles})^2 + (4 \text{ miles})^2} = \sqrt{25 \text{ miles}^2}$

$= \boxed{5 \text{ miles}}$

2. **Perimeters, Areas, and Volumes** (15 points)

(a) A rectangular room measures 9 ft by 12 ft. What is the room's:

i. Perimeter? (2 points)

$2 \times 9 \text{ ft} + 2 \times 12 \text{ ft} = \boxed{42 \text{ ft}}$

ii. Area? (2 points)

$9 \text{ ft} \times 12 \text{ ft} = \boxed{108 \text{ ft}^2}$

(b) For a sphere with a circumference of 69 cm, what is the:

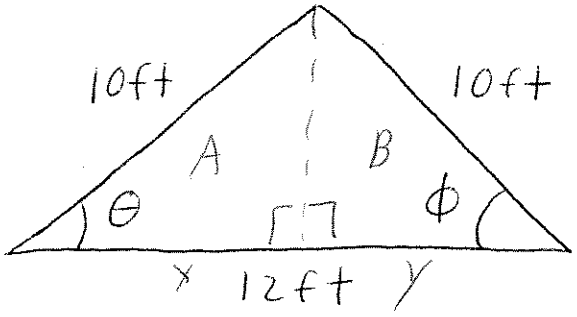
i. Surface area? (3 points) $r = \frac{C}{2\pi} = \frac{69\,cm}{2\pi}$

Surface Area $= 4\pi r^2 = 4\pi\left(\frac{69\,cm}{2\pi}\right)^2 \approx$ ~~6,062 cm²~~ 1,515 cm²

ii. Volume? (3 points)

Volume $= \frac{4}{3}\pi r^3 = \frac{4}{3}\pi\left(\frac{69\,cm}{2\pi}\right)^3 \approx$ 5,547 cm³

(c) What is the area of the triangle below? Note that $\theta = \phi$. (5 points)



Note triangles A and B above are similar, and so sides x and y must have the same length $x = y = \frac{12\,ft}{2} = 6\,ft$.

The height must then be, according to the Pythagorean theorem $h = \sqrt{(10ft)^2 - (6ft)^2} = \sqrt{64\,ft^2}$

$= 8\,ft$

So, the area is $A = \frac{1}{2}(12ft)(8ft) =$ 48 ft²

3. **Extra Credit**

(a) Who is the NBA all time points leader? (1 point)

Kareem Abdul-Jabbar

(b) What is the length of the perimeter of the Koch snowflake? (2 points)

Infinite.

(c) Name one President who served between Ulysses S. Grant and William McKinley. (1 point, 2 points if it's the only President to serve two nonconsecutive terms.)

Many possible answers. Grover Cleveland is the 2 point answer.