

Homework #6 Part A

1. For **(a)**-**(c)**, change each of the given angles in degrees into radians, and for **(d)**-**(f)**, change each of the given angles in radians into degrees. For each, give the proportion of a circle the angle represents.

(a): 240° **(b):** 450° **(c):** 72°

(d): $7\pi/4$ **(e):** $6\pi/5$ **(f):** $11\pi/8$

2. Evaluate the following, noting that all angles are given in radians.

(a): $\cos(3\pi/4)$ **(b):** $\sin(7\pi/6)$ **(c):** $\sin(40\pi)$ **(d):** $\cos(-8\pi/3)$

3. Using the unit circle, explain why for any angle α , we must have **(a):** $\cos(-\alpha) = \cos(\alpha)$, and **(b):** $\sin(-\alpha) = -\sin(\alpha)$. For each, draw a general picture, and then give a few specific examples, with pictures on the unit circle.

4. Suppose a right triangle has hypotenuse c , and one of its non-right angles is θ . What are the other two sides in terms of c and θ ? If $c = 3$ and $\theta = \pi/6$, what are the other two sides? If $c = 2$ and $\theta = \pi/4$, what are the other two sides?

5. Solve for y in the following: $3yx + 4 = 4xy + (2y + 3x)\cos(2xt)$.

(Note: You do not need to actually use trigonometry for this problem.)

6. Find all values of x such that $0 \leq x < 2\pi$ and the following is undefined:

$$\frac{x^3 - 17x^2 - 3x + 2}{\sin(x) - \cos(x)}$$

7. Find all values of x such that $2\sin(x) = 1$.

Hint: First find the two values of x such that $0 \leq x \leq 2\pi$, then use the fact that $\sin(x + 2\pi k) = \sin(x)$ for any integer k .

8. Find all values of x such that

$$-2\cos^2(x) - 7\sin(x) + 5 = 0$$

Hint: First use $\cos^2(x) = 1 - \sin^2(x)$, then factor as a quadratic.

November 11, 2015

Due: Monday, November 16, 2015

Homework #6 Part B

1. Evaluate each of the following:

(a): $\sec(3\pi/4)$ (b): $\tan(5\pi/6)$ (c): $\csc(5\pi/2)$ (d): $\cot(-\pi/4)$

2. Write each of the following in terms of just $\sin(x)$ and $\cos(x)$:

(a): $\tan^2(x) \sec(x) \csc(x)$ (b): $\frac{\csc(x) \cot(x)}{\tan^2(x) \sec(x)}$

3. Find all values x such that the following are undefined. First find the values x such that $0 \leq x < 2\pi$ such that they are undefined, then use the fact that $\sin(x + 2\pi k) = \sin(x)$ or $\cos(x + 2\pi k) = \cos(x)$ for any integer k .

(a): $\tan(x)$ and $\sec(x)$

(b): $\cot(x)$ and $\csc(x)$

4. A search light is on a 20 foot pole, with the beam of light making an angle of θ with the pole. The search light is shining directly on a person's feet who is standing x feet away from the pole. What is the distance x in terms of θ ?

5. Using the unit circle, explain with a picture why we have for any angle α (a): $\sin(\pi - \alpha) = \sin(\alpha)$, and (b): $\cos(\pi - \alpha) = -\cos(\alpha)$. Draw a general picture for each, and give a specific example angle α for each.

(c): Using (a) and (b), what is $\tan(\pi - \alpha)$?

6. Using the graphs of $y = \sin(x)$ or $y = \cos(x)$, sketch the following graphs (HW #5B, Problems 1 and 2 should be useful). Be sure to label your axes and key points on the graphs:

(a): $y = \sin(x) + 1$

(b): $y = \cos(x - \frac{\pi}{4}) - 1$