

## MATH 121 Lowman Exam 3, Spring 2008 Answers

1. (a) Row 1: 0, 0, 1, 0

$$\text{Row 2: } \frac{\pi}{6}, \frac{1}{2}, \frac{\sqrt{3}}{2}, \frac{1}{\sqrt{3}}$$

$$\text{Row 3: } \frac{\pi}{4}, \frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}, 1$$

$$\text{Row 4: } \frac{\pi}{3}, \frac{\sqrt{3}}{2}, \frac{1}{2}, \sqrt{3}$$

$$\text{Row 5: } \frac{\pi}{2}, 1, 0, \text{undefined}$$

(b)  $\sin \theta$  is positive in quadrants I and II;  $\cos \theta$  is positive in quadrants I and IV;  $\tan \theta$  is positive in quadrants I and III

2.  $\sin(x + y) = \sin x \cos y + \cos x \sin y$

$$\cos(x + y) = \cos x \cos y - \sin x \sin y$$

$$\sin 2x = 2 \sin x \cos x$$

$$\cos 2x = 2 \cos^2 x - 1$$

$$\sin^2 x = \frac{1 - \cos 2x}{2}$$

$$\cos^2 x = \frac{1 + \cos 2x}{2}$$

3. period = 7

$$\text{angular frequency} = \frac{2\pi}{7}$$

$$\text{phase shift} = 4$$

$$\text{phase constant} = -\frac{8\pi}{7}$$

$$\text{phase} = \frac{2\pi}{7}t - \frac{8\pi}{7}$$

4. 15,000 rad/hr

5.  $\frac{\sqrt{6} + \sqrt{2}}{4}$

6.  $-\frac{3}{\sqrt{13}}$

7.  $\frac{v}{\sqrt{1-v^2}}$