

MATH 150 MIDTERM 2 (W 2005) ANSWER KEYS

1. (a). $s \approx 14.416$ feet.

(b). $A \approx 50.457$ square feet.

2. θ is in QII.

$$\sin \theta = \frac{\sqrt{5}}{\sqrt{6}},$$

$$\csc \theta = \frac{\sqrt{6}}{\sqrt{5}},$$

$$\cos \theta = \frac{-1}{\sqrt{6}},$$

$$\sec \theta = -\sqrt{6},$$

$$\tan \theta = -\sqrt{5},$$

$$\cot \theta = \frac{-1}{\sqrt{5}}.$$

3. (a). amplitude = 3, period = π , phase shift = $-\frac{\pi}{4}$.

(b). 5 key points: $(-\frac{\pi}{4}, 0)$, $(0, -3)$, $(\frac{\pi}{4}, 0)$, $(\frac{\pi}{2}, 3)$, $(\frac{3\pi}{4}, 0)$.

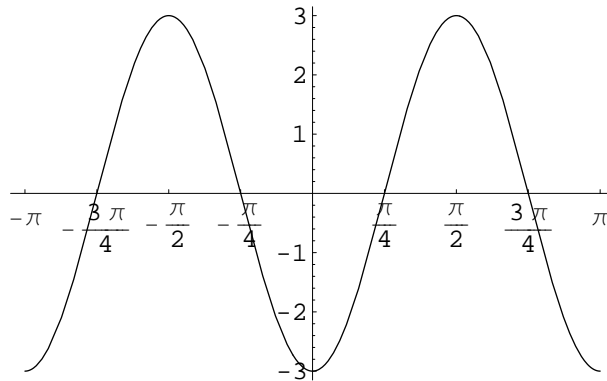


FIGURE 1. $-3 \sin\left(2x + \frac{\pi}{2}\right)$.

4. Let $\theta = \sin^{-1}\left(-\frac{6}{7}\right)$, then $\sin \theta = -\frac{6}{7}$ and θ lies in QIV. So $\tan \theta = -\frac{6}{\sqrt{13}}$.

5. $\cos \theta_1 = \frac{3}{5}$, $\sin \theta_2 = \frac{12}{13}$. So $\cos(\theta_1 + \theta_2) = -\frac{33}{65}$.

6.

$$\begin{aligned} L &= \frac{\cos^2 \theta}{1 - \sin \theta} - \sin \theta \\ &= \frac{\cos^2 \theta}{1 - \sin \theta} - \frac{\sin \theta(1 - \sin \theta)}{1 - \sin \theta} && \text{(common the denominators)} \\ &= \frac{\cos^2 \theta}{1 - \sin \theta} - \frac{\sin \theta - \sin^2 \theta}{1 - \sin \theta} \\ &= \frac{\cos^2 \theta - (\sin \theta - \sin^2 \theta)}{1 - \sin \theta} \\ &= \frac{\cos^2 \theta + \sin^2 \theta - \sin \theta}{1 - \sin \theta} \\ &= \frac{1 - \sin \theta}{1 - \sin \theta} && (\sin^2 \theta + \cos^2 \theta = 1) \\ &= 1 = R. \end{aligned}$$