Name ________________________________ Honors Pre-Calculus Quiz Answers
January 6, 2003 Sections 4.1–4.4

1. **a.** Use $s = r\theta$. Given $r = 2.20$ and $s = 5.50$, so $\theta = 2.5$ radians.

b. $A = \frac{1}{2}r^2\theta = \frac{1}{2}(2.20)^2(2.5) = 6.05\text{ cm}^2$.

2. $\frac{11}{3}\pi$ radians = 660°, which is co-terminal with $\frac{5}{3}\pi$ radians = 300°. See page 360 example 6b for an explanation of why the tangent of either of these angles is $-\sqrt{3}$. Your diagram should look almost like Figure 4.33(a) on page 360, the only change being that your angle should include an additional full revolution (i.e., should be almost 2 full revolutions).

3. Combining the two pieces of given information, θ must be a second quadrant angle. Taking $x = -1$ and $r = 4$, use the Pythagorean Theorem to get $y = \sqrt{15}$. Then:

$\sin\theta = \frac{\sqrt{15}}{4}$ $\tan\theta = -\sqrt{15}$

$\cot\theta = -\frac{1}{\sqrt{15}}$ $\sec\theta = -4$

$\csc\theta = \frac{4}{\sqrt{15}}$

4. sin(x) and sin(–x) are opposites. That is, –sin(x) = sin(–x), or equivalently sin(x) = –sin(–x).

Justification: Consider x and $-x$ **as angles** in a circle diagram. These angles terminate at points on the same radius circle having opposite y-coordinates. In other words, the terminal points have equal r's and opposite y's. Thus the sines of the angles (defined as $\frac{y}{r}$) must be opposites.

5. **a.** $\sin(x) = \sin(x + 2\pi)$, or $\sin(x) = (x - 2\pi)$.

b. $\sin(x) = \cos(x - \frac{\pi}{2})$, or $\sin(x) = \cos(x + \frac{3\pi}{2})$.

6. $d(t) = 5\sin(\frac{2\pi}{12.4}(t - 3.1)) + 25$, or $d(t) = -5\cos(\frac{2\pi}{12.4}t) + 25$.
Graph should be a sinusoidal wave with period = 12.4, max. = 30, and min. = 20; one of its minima must be at $t = 0$.