Here are some solutions to the sample problems.

(1) Given \( y = 3 \cos(\pi x - \frac{\pi}{2}) \), the amplitude is 3, the period is 2, and the phase shift is 1/2. Here's a graph of one cycle.

(2) If \( \sin \theta \) is positive and \( \cos \theta < 0 \), we must be in quadrant II. You can even figure out what triangle to use; since \( \sin \theta = \frac{1}{2} = \frac{y}{r} \), this is a 30°-60°-90 triangle where \( x = -\sqrt{3} \). Hence

\[
\sin \theta = \frac{y}{r} = \frac{1}{2}, \quad \csc \theta = \frac{r}{y} = \frac{2}{1}
\]

\[
\cos \theta = \frac{x}{r} = -\frac{\sqrt{3}}{2}, \quad \sec \theta = \frac{r}{x} = \frac{2}{\sqrt{3}}
\]

\[
\tan \theta = \frac{y}{x} = -\frac{1}{\sqrt{3}}, \quad \cot \theta = \frac{x}{y} = -\frac{\sqrt{3}}{1}
\]

(3) You can check these with a calculator; they’re all found using 45°-45°-90 triangles.

(4) Show that

\[
\cot(\theta) \sin(\theta) + \frac{1}{\sec(\theta)} = \frac{\cos(\theta) \sin(\theta)}{\sin(\theta)} + \frac{\sin^2(\theta)}{1} = \frac{\cos(\theta) \cos(\theta)}{1} + \sin^2(\theta)
\]

\[= \cos^2(\theta) + \sin^2(\theta) = 1 \]

(5) In order, on the unit circle,

(1,0), (\(\sqrt{3}/2, 1/2\)), (1/\(\sqrt{2}\), 1/\(\sqrt{2}\)), (1/\(\sqrt{3}\), 1/\(\sqrt{3}\)), (-1/\(\sqrt{2}\), -1/\(\sqrt{2}\)), (-1, 0)

(6) \( \cos^{-1}(\cos(-\pi/4)) = \cos^{-1}(1/\sqrt{2}) = \pi/4 \), because \( \cos^{-1} \) returns values between 0 and \( \pi \).

(7) 95° is approximately 1.6581 radians. 1 radian is about 57.2958°.
(8) One cycle of the graph of \( y = \tan \left( x - \frac{\pi}{2} \right) \) is shown here.

(9) Other Problems. (Ask me about any other problems; let me know if I've made a typo here so I can correct it for other people.)

**Ch4Rev 90:** $20398.87; 4.04; 17.5\text{yrs}$

**Ch4Rev 91:** $41668.97$

**Ch5Rev 1:** $3\pi/4$

**Ch5Rev 5:** $135^\circ$

**Ch5Rev 25:** 1

**Ch5Rev 61:** Amplitude = 8; period = 4.

**Ch5Rev 69:** Amplitude = 2/3; period = 2; phase shift = 6/\( \pi \).

**Ch5Rev 71:** \( y = 5 \cos \frac{x}{4} \)

**Ch6Rev 5:** $5\pi/6$

**Ch6Rev 11:** $2\sqrt{3}/3$

**Ch6Rev 13:** $3/5$

**Ch6Rev 17:** $-\pi/6$

**Ch6Rev 21:** Hint: \( \tan \theta \cot \theta = 1 \).

**Ch6Rev 35:** (This is harder than what you’d have to do on an exam....)