These are not meant to be detailed solutions. If you can't figure out why a given answer is correct, talk to me or your TA.

1. i) b.

$$\begin{aligned}\frac{\tan(\theta)}{\sec(\theta)} + \frac{1}{csc(\theta)} &= \frac{\tan(\theta)}{1/\cos(\theta)} + \frac{1}{1/\sin(\theta)} = \tan(\theta)\frac{\cos(\theta)}{1} + \sin(\theta) \\ &= \frac{\sin(\theta)}{\cos(\theta)}\cos(\theta) + \sin(\theta) = \sin(\theta) + \sin(\theta)\end{aligned}$$

ii) c.

iii) d. $\sin^{-1}(\sin(3\pi/4)) = \sin^{-1}(1/\sqrt{2}) = \pi/4$.

iv) d.

v) a.

2. a) $\sin^2 30° + \frac{1}{\sec^2 390°} = \sin^2 30° + \cos^2 390° = \sin^2 30° + \cos^2 30° = 1$

b) $\tan\frac{\pi}{4} + \cos\frac{2\pi}{3} = 1 - \frac{1}{2} = \frac{1}{2}$ (Draw a 45-45-90 and 30-60-90 triangle. Note that a point corresponding to the angle $2\pi/3$ was given to you in 1(ii).

c) $\csc\frac{\pi}{4} = \sqrt{2}$ – use the same triangle as you used in part (b).

3. $\cos\theta < 0$ and $\tan\theta > 0$ means θ must be in quadrant three. So to solve this problem you should draw the correct 3-4-5 triangle in the third quadrant; $\cos\theta = -\frac{3}{5} = \frac{x}{r}$ implies that $r = 5$, so $x = -3$. In quadrant three, $y < 0$ so $y = -4$. Now you can write down the trig functions using the definitions:

$$\begin{aligned}\sin\theta = y/r = -4/5, &\quad \csc\theta = r/y = -5/4 \\ \cos\theta = x/4 = -3/5, &\quad \sec\theta = r/x = -5/3 \\ \tan\theta = y/x = 4/3, &\quad \cot\theta = x/y = 4/3\end{aligned}$$

4. Given $y = -5\sin\left(\frac{1}{2}x - \frac{\pi}{2}\right)$, we see that Amplitude $= |-5| = 5$, Period $= T = \frac{2pi}{1/2} = 4\pi$, and the Phase Shift is $\frac{\pi/2}{1/2} = \pi$. If you're not sure how to graph a sin curve with this information, ask me or your TA. (Note that we have a negative sign out front, so the curve will go *down* first.)