Math 222 Worksheet 13 Answers

1. (a) -2

   (b) $2\ln|x-1| - \ln(x^2+1) - \arctan x + C$

   (c) $\frac{1}{3}\cos^3 x - \cos x + C$

   (d) $\frac{1}{4}\text{arcsec}(\frac{x}{2}) - \frac{\sqrt{x^2-4}}{2x^2} + C$ or equivalently $\frac{1}{4}\arccos(\frac{2}{x}) - \frac{\sqrt{x^2-4}}{2x^2} + C$

   (e) $\frac{1}{5}e^{2x}(\sin x + 2\cos x) + C$

   (f) $4\ln|x| - 4\arctan(x+1) - 2\ln(x^2+2x+2) + C$

   (g) $\frac{1}{2}x - \frac{1}{12}\sin(6x) + C$

2. (a) $x + C$

   (b) $I_n = x(\ln x)^n - nI_{n-1}$

   (c) $I_1 = x\ln x - x + C$, $I_2 = x(\ln x)^2 - 2x\ln x + 2x + C$, $I_3 = x(\ln x)^3 - 3x(\ln x)^2 + 6x\ln x - 6x + C$.

3. (a) $\frac{\pi}{2}$

   (b) Does not exist.

   (c) Does not exist.

   (d) $-\ln(\frac{1}{4})$ or equivalently $\ln 4$.

   (e) $\frac{\pi}{2}$

4. (a) Exists.

   (b) Does not exist.

   (c) Exists.

   (d) Does not exist.