QUIZ 8

1. Rewrite the following rational functions in terms of their partial fractions. Note: you do not need to solve for the unknowns A, B, C, etc. Namely, just write the format of the partial fractions.

    a. $\dfrac{4x}{(x+1)(x+2)}$

$$= \frac{A}{x+1} + \frac{B}{x+2}$$

    b. $\dfrac{7x-1}{(x+1)(x^2+1)}$

$$= \frac{A}{x+1} + \frac{Bx+C}{x^2+1}$$

    c. $\dfrac{x^2+4}{x^4(x-1)}$

$$= \frac{A}{x} + \frac{B}{x^2} + \frac{C}{x^3} + \frac{D}{x^4} + \frac{E}{x-1}$$

2. Determine what is wrong with the work below:

    a. $\int \dfrac{x^2+2x+6}{(x+1)(x^2+1)} dx = \int \dfrac{1}{x+1} + \dfrac{2x}{x^2+1} dx = \ln(x+1) + \ln(x^2+1) + C$

    Absolute value signs are missing on the first logarithm:

$$\int \frac{x^2+2x+6}{(x+1)(x^2+1)} dx = \int \frac{1}{x+1} + \frac{2x}{x^2+1} dx = \ln|x+1| + \ln(x^2+1) + C$$

    b. $\int \dfrac{1}{x^2+2x+10} dx = \int \dfrac{1}{(x+1)^2+9} dx = \dfrac{1}{3}\arctan\left(\dfrac{x+1}{3}\right) + C$

    No issues here.