Be careful with step 1. Remember that to divide $\frac{x^4}{x^3+1}$, you do:

$$\begin{array}{r} x - \frac{x}{x^3+1} \\ x^3+1 \overline{) x^4 \phantom{+x)}} \\ -(x^4+x) \\ \hline -x \end{array}$$

In step 2 you'll get Q as the product of linear and irreducible quadratic terms. Based on the outcome, figure out which case it's in (p. 491–497). Once you've written $\frac{R(x)}{Q(x)}$ as the sum of partial fractions with unknowns in the numerators, you can solve this in two ways, either way starting by multiplying both sides by Q(x).

1. Set up a bunch of equations based on the coefficients of $x^0, x^1, x^2, \ldots$ on each side and solve the system.
2. Plug in any values you want for x and solve the resulting equations.

Look at problems 15, 19, 29, 37, 49

§ 7.5 Strategy for Integration

READ THIS SECTION!!!

§ 7.8 Improper Integrals

<u>Definition</u>: An improper integral is one where either the interval is infinite or f has an infinite discontinuity on the interval of integration.

If $\int_a^t f(x)dx$ exists for all $t \geq a$ then $\int_a^\infty f(x)dx = \lim_{t\to\infty} \int_a^t f(x)dx$ (if limit exists)

If $\int_t^a f(x)dx$ exists for all $t \leq a$ then $\int_{-\infty}^a f(x)dx = \lim_{t\to-\infty} \int_t^a f(x)dx$ (if limit exists)

If the limit exists, the integral is <u>convergent</u>. Otherwise it is <u>divergent</u>.

$\int_1^\infty \frac{1}{x^p}$ is convergent if and only if $p > 1$