ENGI 3424 Engineering Mathematics
Five Tutorial Examples of Partial Fractions

1. Express $f(x)$ in partial fractions:

$$f(x) = \frac{4}{x^2 - 4}$$

2. Express $f(x)$ in partial fractions:

$$f(x) = \frac{3x^2 - 1}{x^3 - x}$$

3. Express $f(x)$ in partial fractions:

$$f(x) = \frac{1}{x^3 + x}$$

4. Express $F(s)$ in partial fractions:

$$F(s) = \frac{6s^2 + 2s - 38}{(s-1)(s+1)(s+2)}$$

5. Express $F(s)$ in partial fractions:

$$F(s) = \frac{5s^3 + 7s^2 - 3s + 1}{(s+1)^2 (s^2 + 1)}$$

and why does the simple cover-up rule work (for non-repeated linear factors)?