Algebra and Partial Fractions Math 125

Name Katie Merrill Quiz Section _____

Integration of rational functions is mostly a matter of algebraic manipulation. In this worksheet we shall work through some examples of the necessary techniques.

1a Consider the rational function $f(x) = \dfrac{2x^3 - 4x^2 - 5x + 3}{x^2 - 2x - 3}$. Use long division to get a quotient and a remainder, then write $f(x)$ =quotient + (remainder/divisor).

$$x^2-2x+3 \overline{)\,2x^3-4x^2-5x+3}$$

$2x$

$-(2x^3-4x^2-6x)$

$x+3$ ← Remainder

$$= 2x + \frac{x+3}{x^2-2x-3}$$

1b Now consider the expression $\dfrac{x+3}{x^2-2x-3}$. Factor the denominator into two linear terms.

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