

Full Name: SOLUTIONS

Student #: _____

TA: Maddie

Please provide detailed solutions to the problems below. Correct responses without justification may not receive full credit. The use of a calculator is permitted.

[6 marks] (1.) Evaluate the integral using partial fractions.

$$\frac{5-2x}{x^2+x-2} = \frac{A}{x+2} + \frac{B}{x-1}$$

$$5-2x = A(x-1) + B(x+2)$$

$$\text{if } x=1:$$

$$3 = 3B$$

$$1 = B$$

$$\text{if } x=-2:$$

$$9 = -3A$$

$$-3 = A$$

$$\int \frac{5-2x}{x^2+x-2} dx$$

$$\int \frac{5-2x}{x^2+x-2} dx$$

$$= \int \frac{-3}{x+2} + \frac{1}{x-1} dx$$

$$= -3 \ln|x+2| + \ln|x-1| + C$$

[4 marks] (2.) Write out the form of the partial fraction decomposition of the function, but do not determine the numerical value of the coefficients.

$$\frac{x^2+x+1}{(x+1)(x^2+4)}$$

$$\frac{A}{x+1} + \frac{Bx+C}{x^2+4}$$