

# Math 2300-016: Quiz 3, 2/1/2019

Name: Key

Score: 10/10

Please show your work on all questions.

1. (5 points) Evaluate the following integral:

$$\int \frac{9}{x^2 + 5x - 14} dx$$

$(x+7)(x-2)$

$$\rightarrow \frac{9}{(x+7)(x-2)} = \frac{A}{x+7} + \frac{B}{x-2}$$
$$9 = A(x-2) + B(x+7)$$
$$9 = x(A+B) - 2A + 7B$$
$$\rightarrow A+B=0 \rightarrow A = -B$$
$$-2A + 7B = 9$$
$$2B + 7B = 9$$
$$\rightarrow \boxed{B=1} \quad \boxed{A=-1}$$
$$\rightarrow = \int \frac{-1}{x+7} dx + \int \frac{1}{x-2} dx$$
$$= -\ln|x+7| + \ln|x-2| + C$$

2. (5 points) Evaluate the following integral:

$$\int_0^5 \frac{1}{\sqrt{x}} dx$$
$$= \lim_{T \rightarrow 0^+} \int_T^5 \frac{1}{\sqrt{x}} dx = \lim_{T \rightarrow 0^+} \int_T^5 x^{-1/2} dx$$
$$= \lim_{T \rightarrow 0^+} \left( \frac{x^{1/2}}{1/2} \Big|_T^5 \right)$$
$$= \lim_{T \rightarrow 0^+} (2\sqrt{5} - 2\sqrt{T})$$
$$= \boxed{2\sqrt{5}}$$

- 3 pts for not writing the limit!