

NAME: Solution

MAC 2311 Section 6462
Quiz Ten

Please show all of your work in a NEAT and ORGANIZED fashion.

1. (2 points) Evaluate the indefinite integral.

$$u = x^3 + 5$$
$$du = 3x^2 dx$$

$$\int \frac{x^2}{x^3 + 5} dx =$$
$$\frac{1}{3} \int \frac{3x^2}{x^3 + 5} dx =$$
$$\frac{1}{3} \int \frac{1}{u} du =$$
$$\frac{1}{3} \ln |u| + C = \frac{1}{3} \ln |x^3 + 5| + C$$

2. (2 points) Evaluate the definite integral.

$$u = e^x + 8$$
$$du = e^x dx$$

$$x = 0 \rightarrow u = e^0 + 8 = 9$$

$$x = 1 \rightarrow u = e^1 + 8 = e + 8$$

$$\int_0^1 \frac{e^x}{2\sqrt{e^x + 8}} dx =$$

$$\int_9^{e+8} \frac{1}{2\sqrt{u}} du =$$

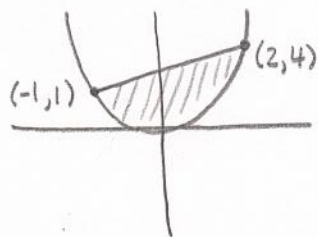
$$\sqrt{u} \Big|_9^{e+8} =$$

$$\sqrt{e+8} - \sqrt{9} = \sqrt{e+8} - 3$$

3. (2 points) Sketch the region enclosed by the given curves and find its area.

$$y = x^2, \quad y = x + 2$$

$$x^2 = x + 2$$
$$x^2 - x - 2 = 0$$
$$(x+1)(x-2) = 0$$
$$x = -1, 2$$
$$y = 1, 4$$



$$\int_{-1}^2 (x+2-x^2) dx =$$
$$\left(\frac{x^2}{2} + 2x - \frac{x^3}{3} \right) \Big|_{-1}^2 =$$
$$2 + 4 - \frac{8}{3} - \left(\frac{1}{2} - 2 + \frac{1}{3} \right) =$$
$$8 - \frac{9}{3} - \frac{1}{2} = 5 - \frac{1}{2} = \frac{9}{2}$$