

# Math 131 - Quiz 12

May 1, 2023

Name key

Score \_\_\_\_\_

Show all work to receive full credit. Supply explanations when necessary.

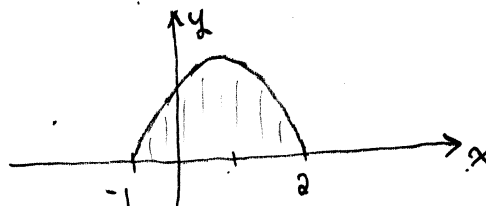
1. (5 points) Use a definite integral to find the area of the bounded region above the  $x$ -axis and below the graph of  $y = 2 + x - x^2$ .

$$\int_{-1}^2 (2 + x - x^2) dx$$

$$y = (2-x)(1+x)$$

X-INTERCEPTS AT

$$x = 2, x = -1$$



$$= 2x + \frac{1}{2}x^2 - \frac{1}{3}x^3 \Big|_{-1}^2$$

$$= \left(4 + 2 - \frac{8}{3}\right) - \left(-2 + \frac{1}{2} + \frac{1}{3}\right) = \boxed{4.5}$$

2. (5 points) Use the fundamental theorem of calculus to evaluate each definite integral.

$$(a) \int_0^{\pi} \sin x dx = -\cos x \Big|_0^{\pi} = \cos x \Big|_{\pi}^0 = \cos 0 - \cos \pi$$
$$1 - (-1) = \boxed{2}$$

$$(b) \int_1^2 \left(\frac{1}{x} - e^x\right) dx$$

$$= \ln|x| - e^x \Big|_1^2 = \ln(2) - e^2 - \ln(1) + e$$

$$= \boxed{\ln(2) + e - e^2 \approx -3.9776}$$