11. [8 points] You are not required to show your work on this page.

a. [2 points] A function $f(x)$ is differentiable. Some values of f and f' are shown in the table below.

x	0	1	2	3	4
$f(x)$	3	4	1	-1	-2
$f'(x)$	2	-2	-3	0	3

Let $g(x) = \cos(\frac{\pi}{2} f(x))$. Which of the following values of x must be a critical point of $g(x)$? Circle all such values.

0 $\boxed{1}$ 2 $\boxed{3}$ $\boxed{4}$ NONE OF THESE

b. [2 points] Which of the following expressions gives the linear approximation for $\arctan(x)$ near $x = 1$? Circle all such expressions.

i. $\boxed{\frac{\pi}{4} + \frac{1}{2}(x-1)}$

ii. $\frac{1}{2} + \frac{\pi}{4}(x-1)$

iii. $\frac{1}{1+x^2} + \frac{\pi}{4}(x-1)$

iv. $\arctan(x) + \frac{1}{2}(x-1)$

v. NONE OF THESE

c. [2 points] Which of the following functions are antiderivatives of $f(x) = \frac{1}{x}$? Circle all such functions.

i. $\ln(|x+1|)$

ii. $\boxed{\ln(|x|)}$

iii. $\boxed{\ln(|x|)+2}$

iv. $\boxed{\ln(4|x|)}$

v. $4\ln(|x|)$

vi. NONE OF THESE

d. [2 points] Suppose n is a positive integer, f is a decreasing, continuous function on the interval $[2, 6]$, the value of the left Riemann sum with n equal subdivisions for $\int_2^6 f(x)dx$ is A, and $f(2) = f(6) + 8$. Circle all the statements that must be true.

i. $\boxed{A \text{ is an overestimate for } \int_2^6 f(x)dx.}$

ii. $\int_2^6 f(x)\,dx = 8$.

iii. $\boxed{\int_1^5 f(x+1)\,dx = \int_2^6 f(x)\,dx.}$

iv. The left Riemann sum for $\int_2^6 (f(x))^2\,dx$ with n equal subdivisions is equal to A^2.

v. NONE OF THESE