

Exam 2 PRACTICE

- (1) Answer each of the following questions about the function $f(x) = \frac{x}{\sqrt{x^2-1}}$

Conduct the following analysis:

Compute and simplify $f'(x)$

Compute and simplify $f''(x)$

Identify the domain.

Identify the x -intercept(s).

Identify the y -intercept.

Identify all vertical asymptotes.

List all intervals of increase and decrease.

List all intervals of upward or downward concavity.

Describe the end behavior.

- (2) Compute the following anti-derivatives:

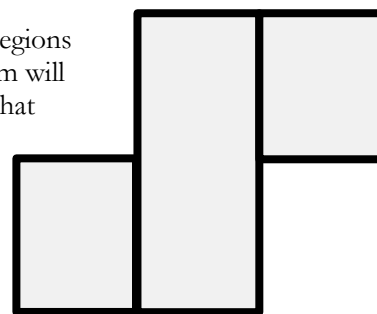
a. $\int 5x^2 - 4x + \sqrt{x} \, dx =$

b. $\int (1 + 5x^2)^3 (5x) \, dx =$

c. $\int \frac{(2x)(3x-1) - (x^2)(3)}{(3x-1)^2} \, dx =$

d. $\int (2x^3 + x)(\sqrt{x}) + (x^4 + x^2)\left(\frac{1}{4\sqrt{x}}\right) \, dx =$

- (3) A landscaper has 400 ft. of fencing to use to enclose three adjacent rectangular regions as shown here. The two smaller rectangles are the same size, and all three of them will have the same width. The center rectangle will twice as long as the other two. What dimensions should be used to enclose the largest possible area?



Answer: Length of center rectangle: _____

Width: _____

- (4) Find all possible solutions of the form $y = kx^n$ to the Differential Equation $2y''x^2 + y'x = 0$.

- (5) Write this expression as a definite integral

$$\lim_{n \rightarrow \infty} \left[\left(\frac{2}{n} \right) \left[\sqrt{4 - \left(\frac{2}{n} \right)^2} + \sqrt{4 - \left(\frac{4}{n} \right)^2} + \sqrt{4 - \left(\frac{6}{n} \right)^2} \dots + \sqrt{4 - \left(\frac{2n}{n} \right)^2} \right] \right]$$