

MA 123 - Exam 3 - Sample Questions from a Previous Exam - Prof. Meuser

1) Find

$$\lim_{x \rightarrow \infty} \frac{e^{x/3}}{x^3}$$

2) A fence 8 ft. tall is parallel to a tall building at a distance of 4 ft. from the building. Find the length of the shortest ladder that will go from the ground over the fence to the side of the building.

3) If

$$f'(x) = 2x - \frac{3}{x^4} \text{ for } x > 0 \text{ and } f(1) = 3$$

Find $f(x)$.

4) Consider the area under $y = 4 - x^2$ and above the x -axis from $x = -2$ to $x = 2$. Using $n = 4$ rectangles, find:

a) An underestimate of this area.

b) An overestimate of this area. In each case make clear what rectangles you are using.

5) Sketch a region in the plane whose area is given by

$$\int_0^4 \sqrt{16 - x^2} dx$$

and evaluate the definite integral by interpreting it as an area.

6) Find

$$\int x(x^2 + 2)^2 dx$$

7) Use Newton's method to find a root of the equation

$$x^3 - x - 1 = 0$$

with $x_1 = 1$. Find the approximations x_2, x_3 and x_4 .