

This quiz is due in class Monday, April 20th.

1. Find f, g, h if

$$(a) f'(x) = \frac{4}{\sqrt{1-x^2}}, f(1/2) = 0$$

$$(b) g''(x) = \frac{3}{\sqrt{x}}, g(4) = 20, g'(4) = 7$$

$$(c) h''(x) = 2e^x + 3 \sin x, h(0) = 0 = h(\pi)$$

2. Consider the function $f(x) = x(x-1)(x+1)$ on the interval $[-1, 0]$.

(a) Find the exact area under the curve $y = f(x)$ and above the x -axis

$$\text{Area} = \int_{-1}^0 f(x) dx = \lim_{n \rightarrow \infty} \sum_{i=1}^n f(x_i) \Delta x$$

by taking a limit of Riemann sums. You may need the formulae

$$\sum_{k=1}^n k = \frac{n(n+1)}{2}, \sum_{k=1}^n k^2 = \frac{n(n+1)(2n+1)}{6}, \sum_{k=1}^n k^3 = \left(\frac{n(n+1)}{2} \right)^2.$$

(b) Find the exact area under the curve $y = f(x)$ and above the x -axis using the fundamental theorem of calculus

$$\int_a^b f(t) dt = F(b) - F(a) \text{ where } F'(x) = f(x).$$