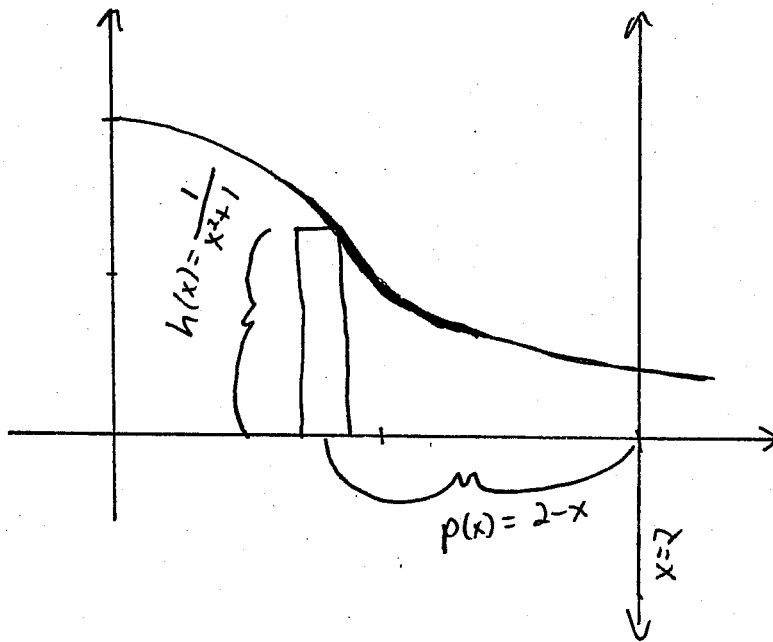


## Quiz 10

This quiz is graded out of 15 marks. No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

**Question 1.** §7.4 #24 (5 marks) Set up, but do not evaluate, an integral for the volume of the solid obtained by rotating the region bounded by the given curves about the specified line.

$$y = \frac{1}{x^2+1}, y=0, x=0, x=2 \quad \text{about } x=2$$



rep. element:

$$\begin{aligned} \Delta V &= 2\pi p(x)h(x)\Delta x \\ &= 2\pi(2-x)\left(\frac{1}{x^2+1}\right)\Delta x \end{aligned}$$

$$\therefore V = \int_0^2 2\pi(2-x)\left(\frac{1}{x^2+1}\right) dx$$

**Question 2.** §7.4 #5 (5 marks) Find the length of the curve.

$$y = \frac{x^5}{6} + \frac{1}{10x^3}, 1 \leq x \leq 2$$

$$y' = \frac{5x^4}{6} - \frac{3}{10x^4}$$

$$s = \int_1^2 \sqrt{1+(y')^2} dx$$

$$= \int_1^2 \sqrt{1 + \frac{25x^8}{36} - \frac{1}{2} + \frac{9}{100x^8}} dx$$

$$= \int_1^2 \sqrt{\frac{25x^8}{36} + \frac{1}{2} + \frac{9}{100x^8}} dx$$

$$= \int_1^2 \sqrt{\left(\frac{5x^4}{6} + \frac{3}{10x^4}\right)^2} dx$$

$$= \int_1^2 \left(\frac{5x^4}{6} + \frac{3}{10x^4}\right) dx$$

$$= \left[ \frac{x^5}{6} - \frac{1}{10x^3} \right]_1^2$$

$$= \left[ \frac{2^5}{6} - \frac{1}{10 \cdot 2^3} \right] - \left[ \frac{1}{6} - \frac{1}{10} \right]$$

$$= \left[ \frac{16}{3} - \frac{1}{80} \right] - \frac{1}{6} + \frac{1}{10}$$

$$= \frac{1261}{240}$$

**Question 3.**(5 marks) Evaluate the indefinite integral:

$$\int \frac{-t^2 + 3t + 5}{t^3 + 5t} dt$$

see test #2