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Quiz 3

This quiz is graded out of 10 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.
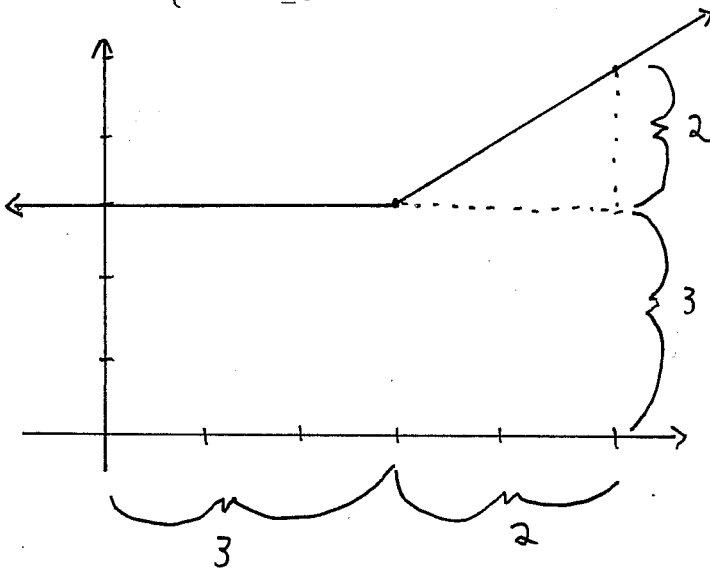
Question 1. *(6 marks)* §5.1 #5c Estimate the area under the graph of $f(x) = 1 + x^2$ from $x = -1$ to $x = 2$ using three rectangles and using midpoints. Sketch the curve and the approximating rectangles.
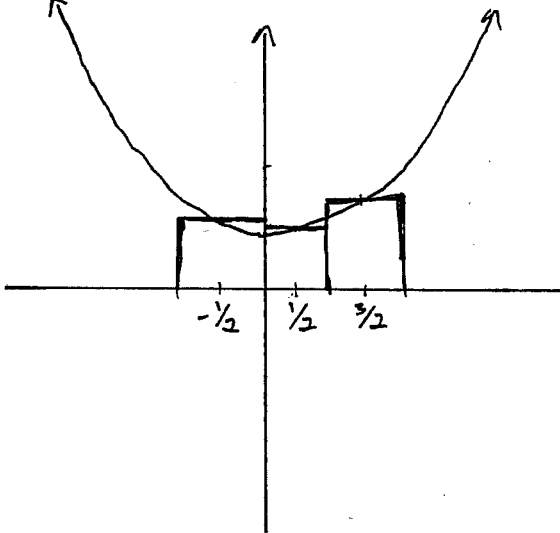
$$\text{Area} \approx R_1 + R_2 + R_3$$

$$= f(-\tfrac{1}{2}) \cdot 1 + f(\tfrac{1}{2}) \cdot 1 + f(\tfrac{3}{2}) \cdot 1$$

$$= \left(1 + (-\tfrac{1}{2})^2\right) \cdot 1 + \left(1 + (\tfrac{1}{2})^2\right) \cdot 1$$

$$\qquad\qquad + \left(1 + (\tfrac{3}{2})^2\right) \cdot 1$$

$$= \tfrac{5}{4} + \tfrac{5}{4} + \tfrac{13}{4}$$

$$= \tfrac{23}{4}$$

Question 2. *(4 marks)* §5.2 #42 Find $\int_0^5 f(x)\,dx$ if

$$f(x) = \begin{cases} 3 & \text{for } x < 3 \\ x & \text{for } x \geq 3 \end{cases}$$

$$\int_0^5 f(x)\,dx = \int_0^3 f(x)\,dx + \int_3^5 f(x)\,dx$$

$$= lw + \left[lw + \tfrac{bh}{2} \right]$$

$$= 3(3) + \left[3(2) + \tfrac{2(2)}{2} \right]$$

$$= 9 + 8$$

$$= 17$$