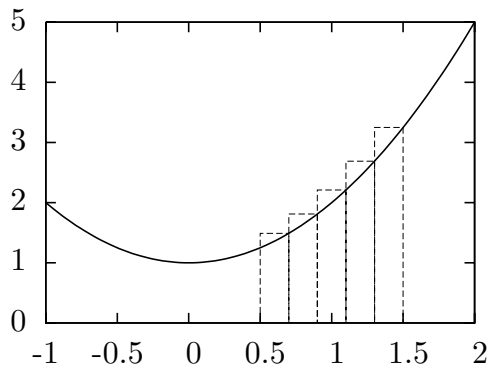Math 181 Honors Quiz 11 Version A

1. Write the sum for area of the five rectangles shown below that approximate the area under the curve $f(x) = x^2 + 1$ between $x = 1/2$ and $x = 3/2$. Do not add up the terms or attempt to simplify the sum.

2. Find the sum $\sum_{k=1}^{n} \left(1 + \dfrac{3k}{n}\right)^2$

3. Compute $\lim\limits_{n\to\infty} \dfrac{(n+1)(2n+1)(\frac{1}{2}n - 5))(3n - 7)}{n^4}$

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4. Find the following limits, derivatives and indefinite integrals:

(i) $\dfrac{d}{dx}\arctan(\sqrt{x^4 + 1})$

(ii) $\displaystyle\int (x + 1)(x^2 - 1)\,dx$

(iii) $\displaystyle\int x^2 \cos x^3 \,dx$

(iv) $\displaystyle\lim_{x \to 0} \dfrac{1 - \cos 5x}{x^2}$