Name: _____ Mark: _____

Mini-math Div 3/4: Wednesday, February 10, 2021 (15 minutes)

1. (2 points) Choose the integral that is the limit of the Riemann Sum: $\lim_{n\to\infty} \sum_{k=1}^{n} \left(1 + \frac{4k}{n}\right)^2 \cdot \frac{4}{n}$

   A. $\int_1^5 (1+x)^2\,dx$ B. $\int_1^5 x^2\,dx$ C. $\int_0^4 (1+4x)^2\,dx$ D. $\int_0^4 x^2\,dx$

   Solution: (b) is correct.

2. (2 points) Choose the integral that is the limit of the Riemann Sum: $\lim_{n\to\infty} \sum_{k=1}^{n} \left(\sqrt{2 + \frac{k}{n}}\right) \cdot \left(\frac{2}{n}\right)$

   A. $\int_0^2 \sqrt{2 + \frac{x}{2}}\,dx$ B. $\int_0^2 \sqrt{2+x}\,dx$ C. $\int_0^2 \sqrt{2+2x}\,dx$ D. $\int_0^2 \sqrt{1+x}\,dx$

   Solution: $\lim_{n\to\infty} \sum_{k=1}^{n} \sqrt{2 + \frac{k}{n}} \cdot \frac{2}{n} = \lim_{n\to\infty} \sum_{k=1}^{n} \sqrt{2 + \frac{1}{2} \cdot \frac{2k}{n}} \cdot \frac{2}{n}$

   (a) is correct.

3. (2 points) Choose the Riemann Sum whose limit is the integral: $\int_0^3 \sin(x^3 - 1)\,dx$

   A. $\lim_{n\to\infty} \sum_{k=1}^{n} \sin\left(\left(\frac{k}{n}\right)^3 - 1\right) \cdot \left(\frac{1}{n}\right)$

   B. $\lim_{n\to\infty} \sum_{k=1}^{n} \sin\left(\left(\frac{k}{n}\right)^3 - 1\right) \cdot \left(\frac{3}{n}\right)$

   C. $\lim_{n\to\infty} \sum_{k=1}^{n} \sin\left(\left(\frac{3k}{n}\right)^3 - 1\right) \cdot \left(\frac{1}{n}\right)$

   D. $\lim_{n\to\infty} \sum_{k=1}^{n} \sin\left(\left(\frac{3k}{n}\right)^3 - 1\right) \cdot \left(\frac{3}{n}\right)$

   Solution: (d) is correct.