Practice Problems: Riemann Sums

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This is a list of practice problems for Math 3B. Feel free to work with a group on any problem. These problems are intended to enhance your knowledge and give you something to bring a boring party back to life.

Evaluate the following Riemann sums by turning them into integrals.

1. $\lim\limits_{n\to\infty} \dfrac{1}{n} \sum\limits_{i=1}^{n} \left(8\left(1+\dfrac{i}{n}\right)^3 + 3\left(1+\dfrac{i}{n}\right)^2 \right)$ (Hint: Interval is $[1,2]$)

2. $\lim\limits_{n\to\infty} \sum\limits_{i=1}^{n} \dfrac{\pi^2 i}{n^2} \cos^2\left(\dfrac{\pi i}{n}\right)$ (Hint: Interval is $[0,\pi]$)

3. $\lim\limits_{n\to\infty} \sum\limits_{i=1}^{n} \dfrac{\frac{i}{n^2}}{\left(\frac{2i}{n}+1\right)^3}$ (Hint: Interval is $[0,1]$)

4. $\lim\limits_{n\to\infty} \sum\limits_{i=1}^{n} \dfrac{96i+20n}{8in+n^2}$ (Hint: Interval is $[0,4]$)