Homework for Math 152H-1 November 27

Reading: Read pgs 339- 342

Homework: For each of the following functions on the prescribed interval, find

(a) The right hand Riemann sum, using n sub-intervals of equal length, in Σ-notation.

(b) An expression for (a) using only n (no Σ-notation). For this use the formulas on pg 338 and

$$sin\,\frac{\pi}{n} + sin\,\frac{2\pi}{n} + sin\,\frac{3\pi}{n} + \ldots + sin\,\frac{(n-1)\pi}{n} = cot\,\frac{\pi}{2n}$$

(c) Compute the limit as $n \to \infty$.

(d) Compare the result to the value of the definite integral computing the same area.

1. $f(x) = 3$ on $[1, 4]$

2. $f(x) = 2\,x$ on $[2, 5]$

3. $f(x) = sin\,x$ on $[0, \pi]$

4. $f(x) = 4 - x^2$ on $[-2, 2]$

5. Use Riemann sums to find the area under $y = \sqrt{x}$ on $[0, 1]$. To do this it is necessary to use non-equal length sub-intervals. Instead use the partition:

$$0 < \frac{1}{n^2} < \frac{4}{n^2} < \ldots < \frac{i^2}{n^2} < \ldots < \frac{(n-1)^2}{n^2} < 1$$

and the formula $(i + 1)^2 - i^2 = 2i + 1$.