

Here are some problems to try so that you know you are up to speed for the fifth quiz.

1. Estimate  $\sin(0.2)$  by a fifth order Taylor polynomial. Hint: expand about 0.
2. Let  $f(x) = x^2 - 5$ , so that  $f(\sqrt{5}) = 0$ . Find the Newton iteration scheme for  $f$ . Starting with  $\sqrt{5} \approx 2 = x_0$ , find the next three estimates  $x_1, x_2, x_3$  of  $\sqrt{5}$ .

3. Find the limit

$$\lim_{x \rightarrow 1} \frac{2x^2 - (3x + 1)\sqrt{x} + 2}{x - 1}$$

4. Show that the limit

$$\lim_{k \rightarrow \infty} \left(1 + \frac{r}{k}\right)^k = e^r$$

5. Find the sum  $42 + 43 + 44 + \cdots + 84$ .

6. Find the sum

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \cdots + \frac{1}{256}$$

7. Let  $P$  be the partition

$$P = \left\{1, \frac{5}{4}, \frac{3}{2}, \frac{7}{4}, 2\right\}$$

and let  $g(x) = 1/(1+x)$ . Find both the upper Darboux sum  $U(g, P)$  and the lower Darboux sum  $L(g, P)$ .