

8) Find avg value  $\frac{1}{b-a} \int_a^b f(x) dx$

4  $f(x) = \sec \frac{\pi x}{6} \quad [0, 2]$

$$\frac{1}{2-0} \cdot \int_0^2 \sec \frac{\pi}{6} \cdot x \, dx$$

$$u = \frac{\pi}{6} x$$
$$du = \frac{\pi}{6} dx$$

$$\frac{1}{2} \cdot \frac{6}{\pi} \cdot \int_0^2 \sec u \, du$$

$$\frac{6}{\pi} du = dx$$

$$u(0) = 0$$
$$u(2) = \pi/3$$

$$\frac{3}{\pi} \left[ \ln |\sec u + \tan u| \Big|_0^{\pi/3} \right]$$

$$\frac{3}{\pi} \left[ \ln |\sec \frac{\pi}{3} + \tan \frac{\pi}{3}| - \ln |\sec 0 + \tan 0| \right]$$

$$\frac{3}{\pi} \left[ \ln(2 + \sqrt{3}) - \ln(1 + 0) \right]$$

$$\frac{3}{\pi} \left[ \ln(2 + \sqrt{3}) \right]$$