

Calculus(II) Quiz9(05/28)

1.

Evaluate the integral.

$$\int_{1/\sqrt{3}}^{\sqrt{3}} \frac{8}{1+x^2} dx$$

[Solution]

$$\int_{1/\sqrt{3}}^{\sqrt{3}} \frac{8}{1+x^2} dx = [8 \arctan x]_{1/\sqrt{3}}^{\sqrt{3}} = 8 \left(\frac{\pi}{3} - \frac{\pi}{6} \right) = 8 \left(\frac{\pi}{6} \right) = \frac{4\pi}{3}$$

2.

8–68 Find the limit. Use l'Hospital's Rule where appropriate. If there is a more elementary method, consider using it. If l'Hospital's Rule doesn't apply, explain why.

$$\lim_{x \rightarrow 1} \frac{\ln x}{\sin \pi x}$$

[Solution]

This limit has the form $\frac{0}{0}$. $\lim_{x \rightarrow 1} \frac{\ln x}{\sin \pi x} \stackrel{H}{=} \lim_{x \rightarrow 1} \frac{1/x}{\pi \cos \pi x} = \frac{1}{\pi(-1)} = -\frac{1}{\pi}$