

236 Quiz 9

April 26, 2011

Name: _____

Name: _____

Name: _____

Work in groups but do NOT split up problems or tasks. You must discuss each problem as a group and agree on a final answer. Hand in one quiz per group.

You may use your hand-written Notebooks but no other materials and no technology at all. Please keep your discussions quiet so as not to disturb or inform other groups.

1. Use the geometric series to show that the Taylor series for $\tan^{-1} x$ at $x = 0$ is

$$\sum_{k=0}^{\infty} \frac{(-1)^k}{2k+1} x^{2k+1}.$$

2. Show that the series for $\tan^{-1} x$ converges on $[-1, 1]$, with conditional convergence on the endpoints.

3. Show that the series for $\int \tan^{-1} x \, dx$ converges on $[-1, 1]$, with absolute convergence on the endpoints.

4. Show that the series for $\frac{d}{dx}(\tan^{-1} x)$ converges on $(-1, 1)$ and diverges for $x = \pm 1$.