

## SAT PREP

### Power series for complex variables.

$$e^z = 1 + z + \frac{z^2}{2!} + \cdots + \frac{z^n}{n!} + \cdots$$

convergent for all finite  $z$

$$\sin z = z - \frac{z^3}{3!} + \frac{z^5}{5!} - \cdots$$

convergent for all finite  $z$

$$\cos z = 1 - \frac{z^2}{2!} + \frac{z^4}{4!} - \cdots$$

convergent for all finite  $z$

$$\ln(1+z) = z - \frac{z^2}{2} + \frac{z^3}{3} - \cdots$$

principal value of  $\ln(1+z)$

This last series converges both on and within the circle  $|z| = 1$  except at the point  $z = -1$ .

$$\tan^{-1} z = z - \frac{z^3}{3} + \frac{z^5}{5} - \cdots$$