Quiz 12   Name: _____Key_____

You must show your work to get full credit.

1. What is the sum of the geomatic series

$$S = 1 + \frac{1}{3} + \frac{1}{3^2} + \frac{1}{3^3} + \cdots + \frac{1}{3^n}.$$

$$S = \frac{3^{n+1} - 1}{2 \cdot 3^n}$$

$S = \dfrac{first - next}{1 - ratio}$

$= \dfrac{1 - \frac{1}{3^{n+1}}}{1 - \frac{1}{3}}$

$= \dfrac{1 - \frac{1}{3^{n+1}}}{\frac{2}{3}}$ ← ok to stop here

$= \dfrac{3^{n+1} - 1}{2 \cdot 3^n}$

$= \dfrac{\left(1 - \frac{1}{3^{n+1}}\right) 3^{n+1}}{\left(\frac{2}{3}\right) 3^{n+1}}$

2. What is the remainder when 52,483 is divided by 9?

The remainder is _____3_____

Recall $10 \equiv 1 \pmod 9$

So $10^k \equiv 1 \pmod 9$ ← ok to skip this step

$52,483 \equiv 5(10)^4 + 2(10)^3 + 4(10)^2 + 8(10) + 2 \pmod 9$

$\equiv 5 + 2 + 4 + 8 + 2 \pmod 9$

$= 21$

$\equiv 3 \pmod 9$