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<div align="center">

MATH 450 Seminar in Proof

$0.\bar{9} = 1$

</div>

Proof. We know that:

$$
\begin{aligned}
0.9 &= \frac{9}{10} + \frac{9}{100} + \frac{9}{1000} + \frac{9}{100000} + ... \\
&= 9\left(\frac{1}{10} + \frac{1}{100} + \frac{1}{1000} + \frac{1}{100000} + ...\right) \\
&= 9\sum_{n=1}^{\infty} \frac{1}{10^n} \\
&= 9\left(\frac{\frac{1}{10}}{1 - \frac{1}{10}}\right) \\
&= 9\left(\frac{\frac{1}{10}}{\frac{9}{10}}\right) \qquad\qquad\qquad\qquad\qquad = 1
\end{aligned}
$$

Thus proved.

$\square$