

Q. 2. Use L'Hopital Rule to Evaluate $\lim_{z \rightarrow 0} \frac{\sin(2z) + 7z^2 - 2z}{z^2(z+1)^2}$

Ans: It's $\frac{0}{0}$ form. as $z \rightarrow 0$

$$\lim_{z \rightarrow 0} \frac{\sin(2z) + 7z^2 - 2z}{z^2(z+1)^2} = \lim_{z \rightarrow 0} \frac{2\cos(2z) + 14z - 2}{4z^3 + 6z^2 + 2z}$$

$$= \lim_{z \rightarrow 0} \frac{4\sin(2z) + 14}{12z^2 + 12z + 2} = \frac{14}{2}$$

$$= 7$$