

MATH 3000: Quiz #1 – SOLUTIONS

/5 **Problem 1:** Solve: $(2 - i)z + 8z^2 = 0$.

$$z(2 - i + 8z) = 0 \implies z = 0 \quad \text{or} \quad z = \frac{i - 2}{8} = -\frac{1}{4} + \frac{1}{8}i$$

/5 **Problem 2:** Show that $|e^z| < 1$ if $\operatorname{Re}z < 0$.

Let $z = x + iy$, then:

$$|e^z| = |e^{x+iy}| = |e^x e^{iy}| = |e^x| \underbrace{|e^{iy}|}_1 = e^x < 1$$

since $x < 0$.

Alternatively:

$$\operatorname{Re}z < 0 \implies |e^z| = \sqrt{e^z e^{\bar{z}}} = \sqrt{e^z e^{\bar{z}}} = \sqrt{e^{z+\bar{z}}} = \sqrt{e^{2\operatorname{Re}z}} < \sqrt{e^0} = 1$$