Identify the locus in the complex plane given by

$$|z - 1| = 3.$$ 

Show in a diagram the region given by $$|z - 1| \leq 3.$$ 

Answer

Let $$z = x + iy$$, so 

$$z - 1 = (x - 1) + iy.$$ 

$$|z - 1|^2 = (x - 1)^2 + y^2 = 9.$$ 

The locus is the circle with centre $$(1, 0)$$ and radius 3.