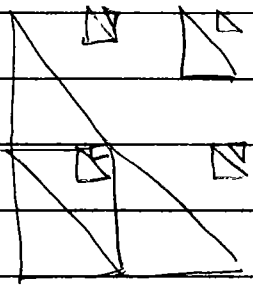

Four copies, three scaled by $r = 1/2$, one copy scaled by $r = 1/4$.

The Moran equation becomes

$$3 \cdot (1/2)^d + (1/4)^d = 1$$

Take $x = (1/2)^d$, so $(1/4)^d = ((1/2)^2)^d = ((1/2)^d)^2 = x^2$

and the Moran equation is

$$3x + x^2 = 1$$

This is a quadratic equation

$$x^2 + 3x - 1 = 0$$

Recall $ax^2 + bx + c = 0$ has roots $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Then $x = \frac{-3 \pm \sqrt{3^2 - 4 \cdot 1 \cdot (-1)}}{2 \cdot 1} = \frac{-3 \pm \sqrt{13}}{2}$

$x = (1/2)^d$, so must be positive, so $x = \frac{-3 + \sqrt{13}}{2}$

Solving $(1/2)^d = \frac{-3 + \sqrt{13}}{2}$ by taking logs gives

$$d \log(1/2) = \log\left((-3 + \sqrt{13})/2\right)$$

$$d = \frac{\log\left((-3 + \sqrt{13})/2\right)}{\log(1/2)}$$