

c) takes 30 pills

Right BEFORE 31st

$$D = 3\left(\frac{1}{2}\right)^{1/7} + 3\left(\frac{1}{2}\right)^{2/7} + \dots + 3\left(\frac{1}{2}\right)^{30/7}$$

$$D = \frac{3\left(\frac{1}{2}\right)^{1/7} - 3\left(\frac{1}{2}\right)^{31/7}}{1 - \left(\frac{1}{2}\right)^{1/7}} = \boxed{27.3 \text{ grains}}$$

$$\text{Right AFTER 31st pill} = \boxed{30.3 \text{ grains}}$$

d) $D = 3 + 3\left(\frac{1}{2}\right)^{1/7} + 3\left(\frac{1}{2}\right)^{2/7} + \dots + 3\left(\frac{1}{2}\right)^{\infty/7}$

$$D = \frac{3}{1 - \left(\frac{1}{2}\right)^{1/7}} \quad (\text{infinite geometric series})$$

$$= \boxed{31.8 \text{ grains}}$$