

CH. 7 IB Questions

$$\frac{\frac{k}{3}}{1 - \frac{1}{3}} = 7$$

$$\frac{\frac{k}{3}}{\frac{2}{3}} = 7$$

$$\frac{k}{2} = 7$$

$$k = 14$$

$$2) \quad a_3 = 9 \quad S_{\infty} = 64$$

$$64 = \frac{a_1}{1-r}$$

$$a_1 r^2 = 9$$

$$a_1 = \frac{9}{r^2}$$

$$64 = \frac{\frac{9}{r^2}}{1-r}$$

$$64 = \frac{9}{r^2} \cdot \frac{1}{1-r}$$

$$64 = \frac{9}{r^2 - r^3}$$

$$64r^2 - 64r^3 = 9$$

$$0 = 64r^3 - 64r^2 + 9$$

^* Plug in calc. *

$$r = -0.326$$

$$a = 84.7$$

$$r = 0.576$$

$$a = 27.1$$

$$r = 0.75$$

$$a = 16$$

$$3) S_{16} = 212$$

$$u_5 = 8$$

$$a) 212 = \frac{16}{2} (u_1 + u_{16})$$

$$8 = u_1 + d(5-1)$$

$$8 = u_1 + 4d$$

$$212 = \frac{16}{2} (u_1 + u_1 + 15d)$$

$$8 - 4d = u_1$$

$$212 = 8(8 - 4d + 8 - 4d + 15d)$$

$$212 = 8(16 + 7d)$$

$$26.5 = 16 + 7d$$

$$10.5 = 7d$$

$$\boxed{1.5 = d}$$

$$u_1 = 8 - 4(1.5)$$

$$\boxed{u_1 = 2}$$

(3) b)

$$600 > \frac{n}{2}(2 + 2 + 1.5(n-1))$$

$$600 > \frac{n}{2}(4 + 1.5n - 1.5)$$

$$1200 > n(2.5 + 1.5n)$$

$$1200 > 2.5n + 1.5n^2$$

$$0 > 1.5n^2 + 2.5n - 1200$$

* Graph (27.5, 0)

$$\boxed{\text{So } 28 = n}$$

4)

a) $u_n = 4(0.95)^{n-1}$

$$u_4 = 4(0.95)^3$$

$$\boxed{u_4 = 3.43 \text{ m}}$$

b) $1 > 4(0.95)^{n-1}$

$$\frac{1}{4} > 0.95^{n-1}$$

$$\ln\left(\frac{1}{4}\right) > \ln 0.95^{n-1}$$

$$\frac{\ln\left(\frac{1}{4}\right)}{\ln(0.95)} > n-1$$

$$28.02 > n$$

$$\boxed{n = 28}$$

c) $S_{\infty} = \frac{4}{1-0.95}$

$S_{\infty} = \boxed{80 \text{ m}}$