

p. 39 #1-5, 6ab

1. a) 1, 2, 4, 8, ... geometric, $r=2$, $t_n = 1 \cdot 2^{n-1}$
 $t_n = 2^{n-1}$

b) 2, 4, 6, 8, ... arithmetic

c) 3, -9, 27, -81, ... geometric, $r=-3$ $t_n = 3 \cdot (-3)^{n-1}$

d) 1, 1, 2, 4, 8, ... not geometric

e) 10, 15, 22.5, 33.75, ...

$$\frac{15}{10} = 1.5, \quad \frac{22.5}{15} = 1.5, \quad \frac{33.75}{22.5} = 1.5 \quad \text{geometric}$$

$$r = 1.5 \quad t_n = 10(1.5)^{n-1}$$

f) -1, -5, -25, -125, ... geometric, $r=5$, $t_n = -1(5)^{n-1}$

2. a) 6, 18, 54, ... ratio = $\frac{18}{6} = 3$, $t_n = 6(3)^{n-1}$

$$t_6 = 6(3)^{6-1}$$

$$t_{10} = 6(3)^{10-1}$$

$$t_6 = 6(243)$$

$$t_{10} = 6(19683)$$

$$t_6 = 1458$$

$$t_{10} = 118098$$

b) 1.28, 0.64, 0.32, ... ratio = $\frac{0.64}{1.28} = 0.5$ $t_n = 1.28(0.5)^{n-1}$

$$t_6 = 1.28(0.5)^{6-1}$$

$$t_{10} = 1.28(0.5)^{10-1}$$

$$t_6 = 1.28(0.03125)$$

$$t_{10} = 1.28(0.0019531)$$

$$t_6 = 0.04$$

$$t_{10} = 0.0025$$

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2. c) $\frac{1}{5}, \frac{3}{5}, \frac{9}{5}, \dots$ ratio = $\frac{3}{5} \div \frac{1}{5} = \frac{3}{5} \cdot \frac{5}{1} = 3$ $t_n = \left(\frac{1}{5}\right) 3^{n-1}$

$$t_6 = \left(\frac{1}{5}\right) 3^{6-1}$$

$$t_{10} = \left(\frac{1}{5}\right) 3^{10-1}$$

$$t_6 = \frac{1}{5} (243)$$

$$t_{10} = \frac{1}{5} (19583)$$

$$t_6 = \frac{243}{5}$$

$$t_{10} = \frac{19583}{5}$$

3. a) $t_1 = 2, r = 3, 2, 6, 18, 54$

b) $t_1 = -3, r = -4, -3, 12, -48, 192$

c) $t_1 = 4, r = -3, 4, -12, 36, -108$

d) $t_1 = 2, r = 0.5, 2, 1, 0.5, 0.25$

4. $8.1 \times r \times r \times r \times r = 240.1$

$$8.1 r^4 = 240.1$$

$$r^4 = 29.641975$$

$$r = 2.333$$

$$t_2 = 18.8973$$

$$t_3 = 44.0874$$

$$t_4 = 102.8559$$

5. a) $r = 2, t_1 = 3$ $t_n = 3(2)^{n-1}$

b) $192, -48, 12, -3, \dots$ ratio = $\frac{-48}{192} = -0.25$, $t_n = 192(-0.25)^{n-1}$

c) $t_3 = 5, t_6 = 135$ $\frac{5}{t_1}, \frac{5}{t_3}, \frac{5}{t_6}$ $5r^3 = 135$

$$r^3 = 27$$

$$r = 3$$

$$t_1 r^2 = 5$$

$$t_1 \cdot 3^2 = 5$$

$$t_1 = \frac{5}{9}$$

$$t_n = \frac{5}{9} (3)^{n-1}$$

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5. d) $t_1 = 4, t_{13} = 16384$

$$4r^{12} = 16384$$

$$r^{12} = 4096$$

$$r = 2$$

$$t_n = 4 \cdot 2^{n-1}$$

6. a) $t_1 = 5, r = 3, t_n = 135$

$$t_n = t_1 r^{n-1}$$

$$\frac{135}{5} = \frac{5 \cdot 3^{n-1}}{5}$$

$$27 = 3^{n-1}$$

$$3^3 = 3^{n-1}$$

$$\therefore 3 = n-1$$

$$4 = n$$

 \therefore means "therefore"

b) $t_1 = -2, r = -3, t_n = -1458$

$$t_n = t_1 r^{n-1}$$

$$\frac{-1458}{-2} = \frac{-2(-3)^{n-1}}{-2}$$

$$729 = (-3)^{n-1}$$

$$3^6 = (-3)^{n-1}$$

$$(-3)^6 = (-3)^{n-1}$$

$$\therefore 6 = n-1$$

$$7 = n$$

 $3^6 = 729$ and $(-3)^6 = 729$
so either works here