

Sequence & Series Review # 2

1.) Arithmetic, $d=3$

$$t_{79} = -7 + (79-1)(3) = 227$$

2.) geometric, $r=\sqrt{2}$

$$t_9 = \sqrt{5} (\sqrt{2})^{9-1} = \sqrt{1280} = 16\sqrt{5} = 35.78$$

3.) Arithmetic

$$S_{26} = \frac{26(-19 + 131)}{2} \rightarrow t_{26} = -19 + (26-1)(6) = 131$$
$$= 1456$$

4.) Arithmetic (given d)

$$31.5 = \frac{n(-3 + (-3 + (n-1)(2.5))}{2}$$

$$63 = -8.5n + 2.5n^2$$

$$0 = 2.5n^2 - 8.5n - 63$$

$$n = 7$$

⑤ Geometric ($r=.2$)

$$S_6 = \frac{65(1-(.2)^6)}{1-.2} = 81.2448$$

⑥ $192 = t_1 (4)^5$ $t_1 = \frac{192}{1024} = \frac{3}{16} = .1875$
 $192 = t_1 (1024)$

⑦ Geometric ($r=1.1$)

$$\begin{aligned} \text{a.) } 10^{\text{th}}, t_{10} &= 5(1.1)^{10-1} = \$11.79 \\ 20^{\text{th}} t_{20} &= 5(1.1)^{20-1} = \$30.58 \\ 40^{\text{th}} t_{40} &= 5(1.1)^{40-1} = \$205.72 \end{aligned}$$

$$\text{b.) } S_{52} = \frac{5(1-1.1^{52})}{1-1.1} = \$7052.15$$

$$\begin{aligned} \text{⑧ } -30 &= 150 + (n-1)(-9) \\ -30 &= 150 - 9n + 9 \\ n &= 21 \end{aligned}$$

$$\begin{aligned} \text{⑨ a.) } x-3 &= \frac{1}{2}x - x \\ x &= 2 \end{aligned}$$

$$\text{b.) } \frac{x}{3} = \frac{\frac{1}{2}x}{x}$$

$$\begin{aligned} x^2 &= \frac{3}{2}x \\ x^2 - \frac{3}{2}x &= 0 \\ x(x - \frac{3}{2}) &= 0 \\ \cancel{x=0} \quad \boxed{x = \frac{3}{2}} \end{aligned}$$

↓
this would mean $r=0$ and $r \neq 0$ by definition

$$\begin{aligned} \text{⑩ a.) } t_1 &= -1 \\ t_2 &= -1 + 4 = 3 \\ t_3 &= 3 + 6 = 9 \\ t_4 &= 9 + 8 = 17 \\ t_5 &= 17 + 10 = 27 \end{aligned}$$

$$\begin{aligned} \text{b.) } t_1 &= 3 \\ t_2 &= 3 \\ t_3 &= 3 + 3 + 3 + 1 = 10 \\ t_4 &= 10 + 3 + 4 + 1 = 18 \\ t_5 &= 18 + 10 + 5 + 1 = 34 \end{aligned}$$

$$\begin{aligned} \text{⑪ } t_1 &= 3 \\ t_n &= t_{n-1} + 3 \end{aligned}$$

$$\textcircled{12} \quad S_{100} = \frac{100(1+397)}{2} \quad t_{100} = 1 + (100-1)(4)$$
$$= 19,900$$

$$\textcircled{13} \quad 256, 128, 64, 32, \dots \quad \text{Geometric, } r = \frac{1}{2}$$
$$t_n = 256 \left(\frac{1}{2}\right)^{n-1}$$

$$\textcircled{14} \quad 11, 22, 33, 44, \dots, 495 \rightarrow n = ?$$

$$495 = 11 + (n-1)(11)$$

$$495 = 11n$$

$$45 = n$$

$$\textcircled{15} \quad S_{45} = \frac{45(11+495)}{2} = 11,385$$

$$\textcircled{16} \quad 6560 = \frac{2(1-3^n)}{1-3}$$

$$-13120 = 2(1-3^n)$$

$$-6560 = 1-3^n$$

$$-6561 = -3^n$$

$$6561 = 3^n$$

$$n = 8$$

$$\textcircled{17} \quad \text{No Sum, diverges } r=2$$

$$18a.) \quad 0 \quad b.) \text{ DNE } (\infty) \quad c.) \quad \frac{7}{10} = \frac{1}{2}$$

$$d.) \quad 0 \quad e.) \quad 5 \quad f.) \quad 0$$

