

10.5

$$1) a_{15} = 3150 \quad a_{16} = 3840 \quad a_{17} = 4624$$

$$a_{18} = 5508 \quad a_{19} = 6498 \quad a_{20} = 7600$$

$$S_n = 31220$$

$$2) a_3 = 27 \quad a_4 = 64 \quad a_5 = 125 \quad a_6 = 216 \quad a_7 = 343$$
$$S_n = 775$$

$$3) a_1 = 64 \quad r = \frac{1}{2} \quad n = 30$$
$$S_{30} = \frac{64(1 - \frac{1}{2}^{30})}{1 - \frac{1}{2}} = 128$$

$$4) a_1 = 1 \quad r = 3 \quad S_n = 3280$$

$$3280 = \frac{1(1-3^n)}{1-3} \quad -2 \cdot 3280 = \frac{(1-3^n)}{-2} \cdot -2$$
$$\begin{array}{r} -6560 = 1 - 3^n \\ -1 \quad -1 \\ \hline -6561 = -3^n \end{array}$$

$$5) a_1 = 8 \quad r = 5 \quad n = 12$$

$$S_{12} = \frac{8(1-5^{12})}{1-5} = 488281248$$

10.6

$$1) a_3 = 12 \quad a_7 = 28$$

$$\frac{12}{3} \quad \frac{16}{4} \quad \frac{20}{5} \quad \frac{24}{6} \quad \frac{28}{7} \quad d = 4$$

$$a_n = 12 + (n-1)4$$

$$2) a_1 = -3 \quad r = -2$$

$$a_n = -3 \cdot -2^{n-1}$$

$$3) \frac{10}{2} \frac{1}{3} \frac{1/10}{4} \frac{1/100}{5} \quad r = 1/10 \quad a_1 = 100$$

$$a_n = 100 \cdot \frac{1}{10}^{n-1}$$

$$4) a_1 = 6.6 \quad d = -1.2$$

$$a_n = 6.6 + (n-1)(-1.2)$$

$$5) a_1 = 8 \quad r = \frac{1}{2}$$

$$a_n = 8 \cdot \frac{1}{2}^{n-1}$$

10.7

$$1) d = 6b \quad a_1 = x \quad a_n = 54$$

$$54 = x + (n-1)6b$$

$$\frac{54 - x}{6b} = \frac{(n-1)6b}{6b}$$

$$\frac{54 - x}{6b} = n - 1$$

$$\frac{54 - x}{6b} + 1 = n$$

$$2) a_1 = 5 \quad a_5 = 25 \quad a_n = 155$$

$$\text{find } d \quad \frac{5}{1} \quad \frac{10}{2} \quad \frac{15}{3} \quad \frac{20}{4} \quad \frac{25}{5} \quad d = 5$$

$$155 = 5 + (n-1)5$$

$$155 = 5n$$

$$n=31$$

$$3) a_1=3 \quad d=7 \quad a_n=52$$

$$52 = 3 + (n-1)7$$

$$52 = 7n - 4$$

$$56 = 7n$$

$$8 = n$$

$$4) a_1=4 \quad d=-6 \quad a_n=-602$$

$$-602 = 4 + (n-1) \cdot (-6)$$

$$-602 = -6n + 10$$

$$-612 = -6n$$

$$n=102$$

$$5) a_1=6 \quad a_3=14 \quad a_n=102$$

$$d=4$$

$$102 = 6 + (n-1)4$$

$$102 = 4n + 2$$

$$100 = 4n$$

$$25 = n$$

10.8

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$$2) a_1=3 \quad r=2 \quad a_n=384$$

$$\frac{384}{3} = \frac{3 \cdot 2^{n-1}}{3}$$

$$128 = 2^{n-1} \quad 2^7 = 128$$

$$\text{So } n=8$$

$$3) a_1 = 800 \quad r = \frac{1}{2} \quad a_n = 6.25$$

$$6.25 = \frac{800 \cdot \frac{1}{2}^{n-1}}{800}$$

$$\frac{1}{128} = \frac{1}{2}^{n-1} \quad \frac{1}{2}^7 = \frac{1}{128}$$

$$n = 8$$

$$4) a_1 = 2 \quad a_3 = 8 \quad a_n = 1024$$

$$\text{find } r \rightarrow \sqrt{2 \cdot 8} = 4 \quad 2, 4, 8 \quad r = 2$$

$$1024 = 2 \cdot 2^{n-1}$$

$$512 = 2^{n-1} \quad 2^9 = 512 \quad \text{so}$$

$$n = 10$$

$$5) a_1 = 3 \quad r = -2 \quad a_n = 49152$$

$$49152 = 3 \cdot (-2)^{n-1}$$

$$16384 = -2^{n-1} \quad -2^{14} = 16384 \quad \text{so}$$

$$n = 15$$

10.9

$$1) a_1 = 8 - 5(1) = 3$$

$$a_{15} = 8 - 5(15) = -67$$

$$S_n = \frac{15}{2}(3 - 67) = -480$$

2) Where do I start  $n = 1$

Where do I end  $a_n = 77$

$$\text{find what term } (n) \text{ 77 is. } 77 = 19 + (n-1)2 \quad n = 30$$

$$\sum_{n=1}^{30} 19 + (n-1)2$$

$$3) a_1 = 507 - 2(1) = 505$$

$$a_{20} = 507 - 2(20) = 467$$

$$S_{20} = \frac{20}{2}(505 + 467) = 9720$$

$$4) a_1 = 2(1) + 9 = 11$$

$$a_{39} = 2(39) + 9 = 81$$

$$S_{39} = \frac{39}{2}(11 + 81) = 1794$$

$$5) \sum_{n=1}^4 \frac{1}{3}^{n-1}$$

10.10

$$1) a_1 = 5225 \quad d = 327$$

$$a_{10} = 5225 + (10-1)327$$

$$= 8168$$

$$2) n = 8 \quad a_1 = 5 \quad a_8 = 28$$

$$S_8 = \frac{8}{2}(5 + 28) = 132$$

$$3) B \rightarrow a_1 = 6 \quad a_n = 32$$

$$S_B = \frac{n}{2}(6 + 32) \text{ Jacob's is twice that}$$

$$S_J = 2 \cdot \frac{n}{2}(38) \text{ or } 38n$$

$$4) a_1 = 53,913 \quad r = 1.02 \quad n = 32$$

$$S_{32} = \frac{53913(1 - 1.02^{32})}{1 - 1.02}$$

$$5) a_1 = 7 \quad d = 3$$

$$7 + (15-1)3 = 49$$

CR

Info Job A  $a_1 = 32000$   $d = 2750$   
Job B  $a_1 = 35,000$   $r = .04$

a)

	Job A	Job B	year 4
1.	32000	35000	
2.	34750.	36400	
3.	37500.	37856	
4.	40250.	39370.24	

b)

	Job A	Job B	year 6
total after n years			
1	32000	35000	
2	66750	71400	
3	104250	109256	
4	144500	148626.24	
5	187500	189571.29	
6	233250	232154.14	

$$C \text{ Job A } a_{20} = 35000 + (20-1)2750 = 87,250$$

$$S_{20} = \frac{20}{2} (35,000 + 87250) = 1222500$$

$$\text{Job B } a_{20} = 35,000 \times 1.04^{20-1} = 73739.72$$

$$S_{20} = \frac{35000 (1 - 1.04^{20})}{1 - 1.04} = 1042232.75$$