Unit 7 (Sequences & Series)

last pg review.

(43) a) $t_n = a + (n-1)(d)$

$= 3 + (n-1)(2)$

$\boxed{t_n = 2n + 1}$

$t_{30} = 2(30) + 1$

$= 61$

b) $t_n = -4 + (n-1)(7)$

$\boxed{t_n = 7n - 11}$

$t_{18} = 7(18) - 11$

$= 115$

(44) a) $t_n = a + (n-1)d$

$169 = 4 + (n-1)(5)$

$n = 34$

b) $-229 = 19 + (n-1)(-8)$

$n = 32$

(45) 1991, 1995, 1999

$a = 1991$

$d = 4$

a) $t_n = a + (n-1)(d)$

$= 1991 + (n-1)(4)$

$\boxed{t_n = 4n + 1987}$

b) $t_{35} = 4(35) + 1987$

$= 2127$

46) a) $t_n = ar^{n-1}$

$= (27)\left(\frac{1}{3}\right)^{n-1} = 3^3\left(3^{-1}\right)^{n-1} = 3^3\left(3^{-n+1}\right) = 3^{-n+4}$

$t_6 = (27)\left(\frac{1}{3}\right)^5$

$= \frac{1}{9}$

b) $a = 1 \qquad r = -3$

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

$t_7 = (-3)^6 = 729$

(47) $t_4 = 24 \Rightarrow ar^3 = 24$

$t_6 = 96 \Rightarrow ar^5 = 96$

$\frac{96}{24} = \frac{ar^5}{ar^3}$

$r^2 = 4$

$r = \pm 2$

$r = 2$: $ar^3 = 24$

$8a = 24$

$a = 3$

$\therefore t_n = 3(2)^{n-1}$

$r = -2$: $ar^3 = 24$

$-8a = 24$

$a = -3$

$t_n = -3(-2)^{n-1}$

b) $t_2 = -6$ $\quad t_5 = -162$

$ar = -6$

$ar^4 = -162$

$$\frac{-162}{-6} = \frac{ar^4}{ar}$$

$r^3 = 27$

$r = 3$

sub $r = 3$ in $ar = -6$

$a = -2$

$\therefore t_n = -2(3)^{n-1}$

48) $t_1 = 3$ $\quad t_2 = 3$

$t_n = t_{n-1} + t_{n-2}$

$t_3 = t_2 + t_1$

$= 3 + 3$

$= 6$

$t_4 = t_3 + t_2$

$= 6 + 3$

$= 9$

$t_5 = 9 + 6$

$= 15$

b) $t_1 = 8$ $\quad (f(1) = 8)$

$t_n = 0.5 t_{n-1}$ $\quad (f(n) = 0.5 f(n-1))$

$t_2 = 0.5 t_1$

$= 4$

$t_3 = 0.5 t_2$

$= 2$

$t_4 = 0.5 t_3$

$= 1$

$t_5 = 0.5 t_4$

$= 0.5$

49) a) $1+2+4+\ldots+1024$

Geometric $r=2$ $a=1$

$ar^{n-1} = 1024$

$1(2)^{n-1} = 1024$

$n-1 = \frac{\log 1024}{\log 2}$

$n-1 = 10$

$n = 11$

b) ARITHMETIC.

$a = -5$ $d = 3$

$133 = a + (n-1)d$

$135 = -5 + (n-1)(3)$

$n = 47$

c) GEO $r = \frac{1}{4}$

$a = 16384$ $t_n = 1$

$1 = (16384)\left(\frac{1}{4}\right)^{n-1}$

$n = 8$

50) a) $S_{25} = \frac{25}{2}\left(2a + (25-1)(d)\right)$

$= \frac{25}{2}\left(-40 + 24(2)\right)$

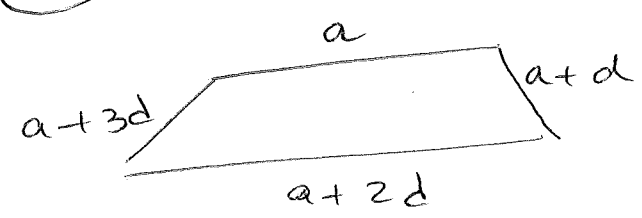
$= 100$

b) Find n: $20 = 1 + (n-1)\left(\frac{1}{4}\right)$

$n = 77$

$S_{77} = \frac{77}{2}(1+20) = 808.5$

(51)



$S_4 = 38$

$a = 5$.

$4a + 6d = 38$

$4(5) + 6d = 38$

$d = 3$.

∴ The lengths are: 5, 8, 11, 14.

(52) $S_{12} = a\left[\frac{r^n - 1}{r-1}\right]$, $r = 12$

$= 4\left[\frac{(-2)^{12} - 1}{-2-1}\right]$ m.

$= -5460$.

52b). $3645 - 1215 + 405 - \ldots + 5$.

$r = -1/3$

$S_n = \frac{r_n - t_1}{r-1} = \frac{(5)(1/3) - 3645}{\frac{1}{3} - 1}$

$= -5465$