HW #31 (12.2) 14, 16, 44 (12.3) 14, 18, 32, 44, 46, 48, 50 (5.1) 16, 18

(12.2)

14) 3, 6, 9, 13, ...

since $a_2 - a_1 = 6 - 3 = 3$
$a_4 - a_3 = 13 - 9 = 4$ there is no common difference **NOT ARITHMETIC**

16) 2, 4, 6, 8 ...

since $a_2 - a_1 = 4 - 2 = 2$
$a_4 - a_3 = 8 - 6 = 2$

IS ARITHMETIC
common difference = 2

44) $a = 3$, $d = 2$, $n = 12$

$$S_{12} = \frac{12}{2}[2a + (12-1)d] = \frac{12}{2}[2 \cdot 3 + 11 \cdot 2] = 168$$

=

(12.8)

14) 2, 6, 18, 36, ...

$\frac{a_2}{a_1} = \frac{6}{2} = 3$ $\frac{a_4}{a_3} = \frac{36}{18} = 2$ since the ratios are not the same,

NOT GEOMETRIC

18) $e^2, e^4, e^6, e^8, \ldots$

$\frac{a_2}{a_1} = \frac{e^4}{e^2} = e^2$, $\frac{a_3}{a_2} = \frac{e^6}{e^4} = e^2$, $\frac{a_4}{a_3} = \frac{e^8}{e^6} = e^2$

GEOMETRIC w/ common ratio e^2

32) $-8, -2, -\frac{1}{2}, -\frac{1}{8}, \ldots$

$r = \frac{a_2}{a_1} = \frac{-2}{-8} = \frac{1}{4}$ $a_5 = a_4 \cdot \frac{1}{4} = -\frac{1}{8} \cdot \frac{1}{4} = -\frac{1}{32}$

$a_5 = -\frac{1}{32}$ $a_n = -8\left(\frac{1}{4}\right)^{n-1}$

≈ -0.03125

44) $a = \frac{2}{3}$, $r = \frac{1}{3}$, $n = 4$

$$S_4 = \left(\frac{2}{3}\right)\frac{1 - \left(\frac{1}{3}\right)^4}{1 - \frac{1}{3}} = \left(\frac{2}{3}\right)\frac{\frac{80}{81}}{\frac{2}{3}} = \frac{80}{81} = S_4$$ ≈ .98765

46) $a_2 = 0.12$ $a_5 = 0.00096$, $n = 4$

$$r^3 = \frac{a_5}{a_2} = \frac{0.00096}{0.12} = 0.008$$

$r = 0.2$

$a_1 = \frac{a_2}{r} = \frac{0.12}{0.2} = 0.6$ so, $S_4 = (0.6)\left(\frac{1 - (0.2)^4}{1 - (0.2)}\right) = 0.7488 = S_4$

48, 50 (5.1) 16, 18

48) $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \ldots - \frac{1}{512}$

$a = 1$, $r = \frac{a_2}{a_1} = \frac{-\frac{1}{2}}{1} = -\frac{1}{2}$ Last term: $\frac{-1}{512} = a_n = 1\left(-\frac{1}{2}\right)^{n-1}$

so $n = 10$

$$S_{10} = (1)\left(\frac{1-(-\frac{1}{2})^{10}}{1-(-\frac{1}{2})}\right) = \boxed{\frac{341}{512} = S_{10}} \approx 0.666$$

50) $\sum_{j=0}^{5} 7\left(\frac{3}{2}\right)^j$

$a = 7$, $r = \frac{3}{2}$, $n = 6$

$$S_6 = (7)\left(\frac{1-(\frac{3}{2})^6}{1-\frac{3}{2}}\right) = 7\left(\frac{1-\frac{729}{64}}{-\frac{1}{2}}\right) = -14\left(1-\frac{729}{64}\right) = \boxed{\frac{4655}{32} = S_6} \approx 145.46$$

(5.1) =

16) $P = \$42{,}000$, $r = 7\frac{3}{4}\%$, $t = 8$ compound quarterly

$$= 42000\left(1+\frac{0.0775}{4}\right)^{8(4)}$$

$$\boxed{= \$77613.38}$$

18) $P = \$180{,}000$, $r = 9\%$, $t = 6\frac{1}{4}$, compounded monthly

$$= 180{,}000\left(1+\frac{0.09}{12}\right)^{6.25(12)}$$

$$\boxed{= \$315{,}247.47}$$