1) Find the first 4 terms and the 100^{th} of the following:
   a) $a_n = n+1$
   b) $a_n = n^n$

2) Find the 42^{th} term, the sum of the first 80 terms and the sum to infinity (if possible) for the following:
   a) $5,8,11,14,...$
   b) $3,\frac{3}{2},0,-\frac{3}{2},...$
   c) $2,4,8,16,...$
   d) $3,\frac{3}{2},\frac{3}{4},\frac{3}{8},...$

3) Express the repeating decimal as a fraction:
   a) $0.030303...$
   b) $2.11\overline{25}$

4) Expand the following using Binomial Theorem:
   a) $\left(\frac{1}{x}-\sqrt{x}\right)^5$
   b) $\left(2+\frac{x}{2}\right)^5$

5) Find the term containing x^4 in the expansion $(x+2y)^{10}$.

6) Find the coefficient containing b^8 in the expansion $\left(a+b^2\right)^{12}$.

Answer:

1)
   a) $2, 3, 4, 5 \quad ; 101$
   b) $1, 4, 27, 256 \quad ; 100^{100}$

2)
   a) $T_{42} = 128;\ S_{80} = 9880$
   b) $T_{42} = -58.5;\ S_{80} = -4500$
   c) $T_{42} = 9.67 \times 10^{24};\ S_{80} = -9.74 \times 10^{47}$
   d) $T_{42} = 1.36 \times 10^{-12};\ S_{80} = 6;\ S_{\infty} = 6$

3)
   a) $\frac{1}{33}$
   b) $\frac{10457}{4950}$

4)
   a) $\frac{1}{x^5} - \frac{5\sqrt{x}}{x^4} + \frac{10}{x^2} - \frac{10\sqrt{x}}{x} + 5x - x^2\sqrt{x}$
   b) $32 + 40x + 20x^2 + 5x^3 + \frac{5x^4}{8} + \frac{x^5}{32}$

5) $13440x^4y^6$
6) $495a^8$