1.   Determine whether $\displaystyle\sum_{n=2}^{\infty} \frac{(n-3)(n+4)}{n(n+1)(n-1)}$ converges or diverges.

2.   Determine whether $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{n\, ln(n)}$ converges or diverges

3. Determine whether $\displaystyle\sum_{n=1}^{\infty} (3^n\, n\, -\, 2)^{-1}$ converges or diverges

4. For the convergent alternating series $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^4}$, what is the smallest number

of terms needed to approximate the sum within 10^{-8} of its actual value?

5. Find the interval and radius of convergence for $\displaystyle\sum_{n=1}^{\infty} \frac{(x+1)^{2n}}{(-4)^n \, n^{1/3}}$

6. Find the interval and radius of convergence for $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n \, (x)^{2n}}{n \, 4^n}$

7. Find a power series representation and its interval of convergence for

$$f(x) = \frac{3x^2}{(x-3)^2}$$

8. Determine whether $\displaystyle\sum_{n=1}^{\infty} (3^{1/n} - 1)$ converges or diverges

9. Determine whether $\displaystyle\sum_{n=1}^{\infty} \frac{(n!)^n}{n^{4n}}$ converges or diverges

10. Determine whether $\displaystyle\sum_{n=1}^{\infty} \frac{2^{1/n}}{n^2}$ converges or diverges

11. Determine whether $\sum \dfrac{1}{n + n \cdot \cos^2 n}$ converges or diverges

12. Find the sum of $\displaystyle\sum_{n=1}^{\infty} \dfrac{n}{2^n}$

13. Find the sum of $\dfrac{1}{1 \cdot 2} - \dfrac{1}{3 \cdot 2^3} + \dfrac{1}{5 \cdot 2^5} - \dfrac{1}{7 \cdot 2^7} \cdots$

14. Find the sum of $\displaystyle\sum_{n=1}^{\infty} \dfrac{1}{n(n+3)}$

15. Express the repeating decimal 4.17326326326 . . . as a fraction.