

- 1) Let  $a_n = \frac{2n}{3n+1}$ .
- Determine whether  $a_n$  is convergent.
  - Determine whether  $\sum_{n=1}^{\infty} a_n$  is convergent.

Determine whether the series is convergent or divergent. If it is convergent, find its sum.

2)  $3 + 2 + \frac{4}{3} + \frac{8}{9} + \dots$

3)  $\sum_{n=1}^{\infty} 5 \left( \frac{2}{3} \right)^{n-1}$

4)  $\sum_{n=1}^{\infty} \frac{(-6)^{n-1}}{5^{n-1}}$

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

$$6) \sum_{n=1}^{\infty} \frac{n}{n+5}$$

$$7) \sum_{n=1}^{\infty} \frac{3}{n}$$

$$8) \sum_{n=2}^{\infty} \frac{2}{n^2-1}$$

$$9) \sum_{n=1}^{\infty} \frac{(n+1)^2}{n(n+2)}$$

$$10) \sum_{n=1}^{\infty} \frac{2}{n^2 + 4n + 3}$$

$$11) \sum_{n=1}^{\infty} \frac{3^n + 2^n}{6^n}$$

$$12) \sum_{n=1}^{\infty} \arctan(n)$$

$$13) \sum_{n=1}^{\infty} (\cos 1)^n$$

$$14) \sum_{n=1}^{\infty} \left( \frac{3}{n(n+3)} + \frac{5}{4^n} \right)$$

Express the number as a ratio of integers.

$$15) 0.\overline{2}$$

$$16) 0.\overline{73}$$

17)  $6.\overline{254}$

18)  $0.1234\overline{56}$

Find the values of  $x$  for which the series converges. Find the sum of the series for those values of  $x$ .

19)  $\sum_{n=1}^{\infty} \frac{x^n}{3^n}$

20)  $\sum_{n=1}^{\infty} (x-4)^n$

$$21) \sum_{n=0}^{\infty} 4^n x^n$$

$$22) \sum_{n=0}^{\infty} \frac{\cos^n x}{2^n}$$

$$23) \text{ If the } n\text{th partial sum of a series } \sum_{n=1}^{\infty} a_n \text{ is } s_n = \frac{n-1}{n+1} \text{ find } a_n \text{ and } \sum_{n=1}^{\infty} a_n .$$

$$24) \text{ What is the value of } c \text{ if } \sum_{n=2}^{\infty} (1+c)^{-n} = 2 ?$$