

# Equation

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# Chapter 1

## Equation

### 1.1 Question 1

$$e = 2 + \frac{1}{1 + \frac{1}{2 + \frac{2}{3 + \frac{3}{4 + \frac{4}{5 + \ddots}}}}}$$

### 1.2 Question 2

$$e = 3 - \sum_{n=1}^{\infty} \frac{1}{k!(k-1)k} = 3 - \frac{1}{4} - \frac{1}{36} - \frac{1}{288} - \frac{1}{2400} - \frac{1}{21600} - \frac{1}{211680} - \frac{1}{2257920} - \dots \quad (1.1)$$

### 1.3 Question 3

$$e = \left(\frac{2}{1}\right)^{1/1} \left(\frac{2^2}{1 \cdot 3}\right)^{1/2} \left(\frac{2^3 \cdot 4}{1 \cdot 3^3}\right)^{1/3} \left(\frac{2^4 \cdot 4^4}{1 \cdot 3^6 \cdot 5}\right)^{1/4} \dots \quad (1.2)$$

## 1.4 Question 4

Given  $\vec{a} = \begin{pmatrix} a_1 \\ a_2 \\ a_3 \end{pmatrix}$  and  $\vec{b} = \begin{pmatrix} b_1 \\ b_2 \\ b_3 \end{pmatrix}$ . The cross product is defined by:

$$\vec{a} \cdot \vec{b} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \end{vmatrix} = (a_2b_3 - a_3b_2)\vec{i} - (a_1b_3 - a_3b_1)\vec{j} + (a_1b_2 - a_2b_1)\vec{k}$$