

Ejercicios de matemáticas

by
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Ejercicios:

Demuéstrese por inducción matemática

1.

$$\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \cdots + \frac{1}{n(n+1)} = \frac{n}{n+1}$$

$$\frac{n}{n+1} + \frac{1}{(n+1)(n+2)} = \frac{n+1}{n+2}$$

$$\frac{n}{1} + \frac{1}{n+2} = \frac{(n+1)(n+1)}{n+2}$$

$$\frac{n(n+2)}{n+2} + \frac{1}{n+2} = \frac{(n+1)(n+1)}{n+2}$$

$$n^2 + 2n + 1 = (n+1)(n+1)$$

2.

$$\frac{1}{2} + \frac{2}{2^2} + \frac{3}{2^3} + \cdots + \frac{n}{2^n} = 2 - \frac{n+2}{2^n}$$

$$\frac{2^{(n+1)}}{2^n} - \frac{n+2}{2^n} + \frac{(n+1)}{2^{(n+1)}} = \frac{2^{(n+2)}}{2^{(n+1)}} - \frac{n+3}{2^{(n+1)}} + \frac{n+1}{2^{(n+1)}}$$

$$\frac{2^{(n+2)}}{2^{(n+1)}} - \frac{2n+4}{2^{(n+1)}} + \frac{(n+1)}{2^{(n+1)}} = \frac{2^{(n+2)}}{2^{(n+1)}} - \frac{n+3}{2^{(n+1)}}$$