$$\boxed{\prod_{i=2}^{n}\left(1-\frac{1}{i^2}\right) = \frac{n+1}{2\cdot n}}$$ PROPIEDAD P

DEM por inducción.

PASO BASE $n=2$

$$\left.\begin{array}{l} \displaystyle\prod_{i=2}^{2}\left(1-\frac{1}{i^2}\right) = \frac{3}{4} \\ \\ \displaystyle\frac{n+1}{2.n} \xRightarrow{\text{sustituyo } n=2} \frac{2+1}{2\times 2} = \frac{3}{4} \end{array}\right\} P(2) \text{ se cumple}$$

PASO INDUCTIVO

(H) $$P(n) = \prod_{i=2}^{n}\left(1-\frac{1}{i^2}\right) = \frac{n+1}{2\times n}$$

(T) $$P(n+1) = \prod_{i=2}^{n+1}\left(1-\frac{1}{i^2}\right) = \frac{(n+1)+1}{2\times(n+1)} = \frac{n+2}{2n+2}$$

DEM

$$\prod_{i=2}^{n+1}\left(1-\frac{1}{i^2}\right) = \underbrace{\left[\prod_{i=2}^{n}\left(1-\frac{1}{i^2}\right)\right]}_{(H)} \times \left(1-\frac{1}{(n+1)^2}\right)$$

$$\left(\frac{n+1}{2n}\right)\left(1-\frac{1}{(n+1)^2}\right) = \left(\frac{n+1}{2n}\right) \times \left(\frac{n^2+2n}{n^2+2n+1}\right)$$

(x)

obs

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

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

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

distribution

obs

$n^2+3n+2 = (n+2)(n+1)$

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