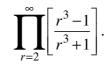
## **Question 9**

The product operator  $\prod$ , is defined as

$$\prod_{i=1}^{k} [u_i] = u_1 \times u_2 \times u_3 \times u_4 \times \dots \times u_{k-1} \times u_k$$

Evaluate, showing a clear method





$ \begin{array}{l} & \bigcap_{\substack{l \geq 1 \\ l \geq k}} & \left[ \frac{l+1}{l^2 + 1} \right] = \left[ \bigcup_{\substack{k \neq j \geq k \\ k \neq j \geq k}} & \left[ \frac{k}{l + 1} \left( \frac{\left( \frac{k}{l+1} \right) \left( \frac{l^2}{l + 1} \right) \left( \frac{k}{l + 1} \right)}{\left( \frac{k}{l + 1} \right) \left( \frac{k}{l + 1} + 1 \right)} \right] \right] \\ & = \left[ \bigcup_{\substack{k \neq j \geq k \\ k \neq j \geq k}} & \left[ \frac{\left( \frac{k}{l + 1} \right) \left( \frac{k}{l + 1} + \frac{k}{l + 1} \right) \left( \frac{k}{l + 1} + \frac{k}{l + 1} \right) \left( \frac{k}{l + 1} + \frac{k}{l + 1} \right) \left( \frac{k}{l + 1} + \frac{k}{l + 1} \right) \left( \frac{k}{l + 1} + \frac{k}{l + 1} \right) \right] \right] \right] $
$= \bigcup_{k \to \infty} \left[ \frac{(X_1^k)}{3\chi_3} \times \frac{2\chi(3)}{4\chi^2} \times \frac{3\chi(2)}{3\chi(3)} \times \frac{4\chi(3)}{6\chi(2)} \times \frac{5\chi(4)}{7\chi(2)} \times \cdots \times \frac{(k-1)(k+1)}{(k+1)(2+1)} \right]$
E-10 (E-10+4)
= Lon ( Bartister - 12 × (1) ( 3× 3× 31×
$= \bigcup_{\substack{k \to \infty}} \left[ \frac{1 \times 2}{k \zeta_{k+1}} \times \frac{\zeta_{k+k+1}}{3} \right] = \bigcup_{\substack{k \to \infty}} \left[ \frac{2}{\sqrt{3}} \frac{\zeta_{k+k+1}}{k^2 + k} \right]$
= 2