

北一女中 103 學年度《數戰數決》有獎徵答活動

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題號：5-4 頁碼/總頁數：\_\_\_\_\_ (如果只有一頁，可不填)

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

$$\text{原式} = \frac{3-\sqrt{2}}{2-\sqrt{2}} \times \frac{4-\sqrt{2}}{3-\sqrt{2}} \times \frac{5-\sqrt{2}}{4-\sqrt{2}} \times \dots \times \frac{2017-\sqrt{2}}{2016-\sqrt{2}}$$

$$= \frac{2017-\sqrt{2}}{2-\sqrt{2}} = \frac{(2017-\sqrt{2})(2+\sqrt{2})}{(2-\sqrt{2})(2+\sqrt{2})} = \frac{4032+2015\sqrt{2}}{2} = 2016 + \frac{2015}{2}\sqrt{2}$$

$$\Rightarrow (p, q) = \left(2016, \frac{2015}{2}\right)$$