| P425/1 | S.6 PURE MATHEMATICS BELIEF TEST 1<br>TIME: 1 Hour | |
|---|---|---|
| 1. | Given that the line $y = mx + c$ is a tangent to the circle $(x-a)^2 + (y-b)^2 = r^2$ .<br>Show that $(1 + m^2)r^2 = (c - b + am)^2$ | *05 marks* |
| | | |
| 2. | Prove that $tan^{-1}\left(\frac{x}{x+y}\right) + tan^{-1}\left(\frac{y}{2x+y}\right) = \frac{\pi}{4}$ | *05 marks* |
| | | |
| 3. | Sketch the curve $y = \frac{2x^2-9x-18}{x^2-x-2}$ showing clearly the asymptotes and turning points. | *12 marks* |
| | | |
| 4. | Show that $1 + i\sqrt{2}$ is a root of the polynomial $x^4 + x^2 + 2x + 6$, hence , find the other roots of the equation $x^4 + x^2 + 2x + 6 = 0$ | *05 marks* |
| | | |
| 5. | Given that points $A(2, 13, -5), B(3, y, -3) and\ C(6, -7, m)$ are collinear, find $m\ and\ y$. | *05 marks* |
| | | |
| 6. | (a) If the roots of the equation $x^2 + 2ax + b^2 = 0$ are $\alpha_1 and\ \beta_1$ and the roots of the equation $x^2 + 2cx + d^2 = 0$ are $\alpha_2 and\ \beta_2$ ,<br>Prove that if $\alpha_1\alpha_2 + \beta_1\beta_2 = 0$, then $b^2d^2 = a^2d^2 + b^2c^2$.<br><br>(b) Prove that $\binom{n}{r} + \binom{n}{r-1} = \binom{n+1}{r}$ | *12 marks* |
| | **END.** | |

**CHECK NOTE:**

- *Read through the question well and identify the correct approach required.*
- *Apply the right concept*
- *Use the right/ correct steps*
- *A good handwriting and neat presentation should be emphasized.*
- *Think about time. Most times candidates fail to complete the paper due failure to manage time. Give each number its worthy duration.*
- *A distinction draws you much closer to an A.*