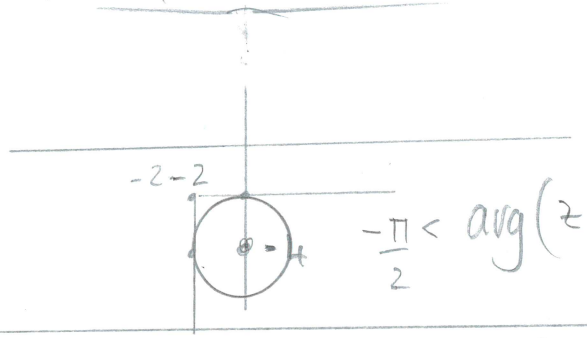
① Test 4 Answers



$-\frac{\pi}{2} < \arg(z+2+2i) < 0$

② $\alpha = 5+i$
$\beta = 5-i$
$\gamma = 3+4i$
$\delta = 3-4i$

$\alpha\beta + \alpha\gamma + \alpha\delta + \beta\gamma + \beta\delta + \gamma\delta$
or $\frac{c}{a}$ in $ax^4+bx^3+cx^2+dx+e=0$

$(x^2-10x+26)(x^2-6x+25)=0$

$25x^2+60x^2+26x^2 = 111$

$\therefore \Sigma\alpha\beta = \frac{111}{1} = 111$

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

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

$= n\left[n(2n+1)^2-2\right]$

$= n\left[n(4n^2+4n+1)-2\right]$

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

④ $\alpha^3+\beta^3+\gamma^3 \equiv (\Sigma\alpha)^3 - 3(\Sigma\alpha)(\Sigma\alpha\beta) + 3\alpha\beta\gamma$

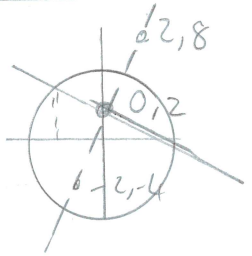
$a=3, b=0, c=-1, d=1 \quad \therefore \Sigma\alpha = 0 \quad \alpha\beta\gamma = -\frac{1}{3}$

$\therefore \alpha^3+\beta^3+\gamma^3 = 0 - 3(0) + 3\left(-\frac{1}{3}\right)$

$\alpha^3+\beta^3+\gamma^3 = -1$

$\alpha^3+\beta^3+\gamma^3+1 = 0$

⑤



$y = -\frac{1}{3}x+2$ ①

$x^2+y^2=36$ ②

$x^2+\left(2-\frac{1}{3}x\right)^2 = 36$

$x = -\frac{24}{5} \quad x=6$

$y = \frac{18}{5} \quad y=0$

$z_1 = -\frac{24}{5} + \frac{18}{5}i$

or $z_2 = 6$

$|z_1| = 6 \quad \arg(z_1) = \pi - \tan^{-1}\left(\frac{18}{24}\right)$
$= \pi - 0.6435$
$= 2.50$

$z_1 = 6(\cos(2.50) + i\sin(2.50))$

$z_2 = 6(\cos(0) + i\sin(0))$