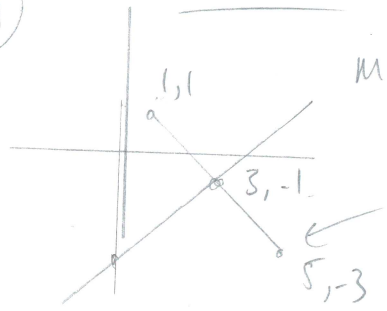
Answers

① 

$m = \frac{1--3}{1-5} = \frac{4}{-4}$

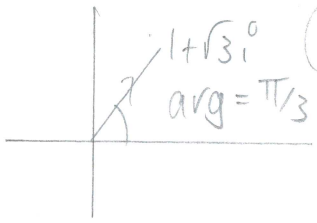
$y+1 = 1(x-3)$

$y = x-4$ $\quad y = -x$

$-x = x-4$

$x = 2 \quad y = -2 \quad \therefore \sqrt{2^2+2^2}$

$= 2\sqrt{2}$

② 

ⓐ $\arg z_1 + \arg z_2 = \arg(z_1 z_2)$

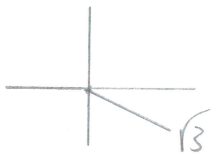
$\therefore \pi/3 \times \arg z_2 = -2$

$\arg z_2 = \frac{-\pi}{6}$

$\frac{|z_1|}{|z_2|} = \left|\frac{z_1}{z_2}\right| = 1 \quad \therefore |z_2| = 2$

$2\left(\cos\left(\frac{-\pi}{6}\right) + i\sin\left(\frac{-\pi}{6}\right)\right) = 2\left(\frac{\sqrt{3}}{2} + 2i\left(-\frac{1}{2}\right)\right)$

$= \sqrt{3} - i$

ⓑ 

③ $\Sigma\alpha = 2$

$\Sigma\alpha\beta = \frac{5}{2}$

$\alpha\beta\gamma = -3$

$\alpha^3+\beta^3+\gamma^3$

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

$= (2)^3 - 3(2)\left(\frac{5}{2}\right) + 3(-3)$

$= 8 - 15 - 9 = -16$ ✓

④ $4\Sigma r = 840$

$\Sigma r = 210$

$\therefore \frac{1}{2}(k)(k+1) = 210$

$k(k+1) = 420$

$k^2 + k - 420 = 0$

$(k+21)(k-20) = 0$

$k \neq -21, \; k = 20$ ✓

$4\sum_{r=10}^{k}(r^2-1) = 4\left(\sum_{r=10}^{20} r^2 - \sum_{r=10}^{20} 1\right)$

$= 4\left[\frac{1}{6}n(n+1)(2n+1) - n\right]$

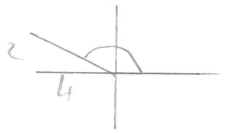
when $n=20 \; S = 11400$

when $n=9 \; S = 1104$

$\therefore 10296$

⑤ $z = \frac{-10}{(2+i)} \Rightarrow \frac{-10(2-i)}{5} \Rightarrow -2(2-i) =$

$-4+2i$



$\pi - \tan^{-1}\left(\frac{2}{4}\right)$

2.68^c

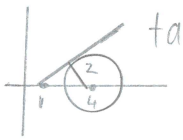
⑥ $x^4 - 10x^3 - 40x^2 - 70x + 39 = 0$

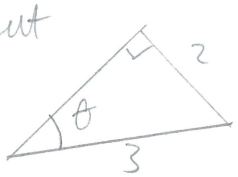
let $w = 2x$

$\therefore \frac{w}{2} = x$

$\left(\frac{w}{2}\right)^4 - 10\left(\frac{w}{2}\right)^3 - 40\left(\frac{w}{2}\right)^2 - 70\left(\frac{w}{2}\right) + 39 = 0$

$w^4 - 20w^3 - 160w^2 - 560w + 624 = 0$

⑦ 



$\arcsin\left(\frac{2}{3}\right)$

⑧ $8p + 41 = 57$

$8p = 16$

ⓐ $p = 2$

$\therefore \alpha\beta\gamma = \frac{-41(2)}{-1} = +82$

ⓑ $\frac{\alpha\beta + \alpha\gamma + \beta\gamma}{\alpha\beta\gamma} = \frac{57}{82}$