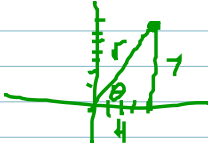


Math 1060 6.2.6 |

$z_1 = 4+7i$, $z_2 = -2-6i$, Find $z_1 z_2$ & $\frac{z_1}{z_2}$

z_1 :




$$r^2 = 4^2 + 7^2 = 65$$

$$r = \sqrt{65}$$

$$\tan \theta = \frac{7}{4} \quad \theta = \tan^{-1}\left(\frac{7}{4}\right) = 60.26^\circ$$

z_2 :



$$r^2 = (-6)^2 + (-2)^2 = 40$$

$$r = \sqrt{40} = 2\sqrt{10}$$

$$\tan \alpha = \frac{-6}{-2} = 3 \quad \alpha = \tan^{-1}(3)$$

$$\theta = 180^\circ + \tan^{-1}(3) = 251.57^\circ$$

$$z_1 z_2 = \sqrt{65} \cdot \sqrt{40} \left[\cos(\tan^{-1}\left(\frac{7}{4}\right) + 180^\circ + \tan^{-1}(3)) \right. \\ \left. + i \sin(\tan^{-1}\left(\frac{7}{4}\right) + 180^\circ + \tan^{-1}(3)) \right]$$

$$= 34 + -38i = \boxed{34 - 38i}$$

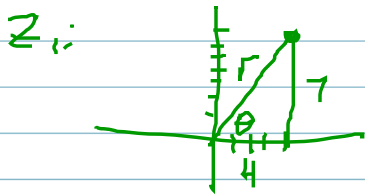
34.01 - 37.99i

$$\frac{z_1}{z_2} = \frac{\sqrt{65}}{\sqrt{40}} \left[\cos(\tan^{-1}\left(\frac{7}{4}\right) - (180^\circ + \tan^{-1}(3))) \right. \\ \left. + i \sin(\tan^{-1}\left(\frac{7}{4}\right) - (180^\circ + \tan^{-1}(3))) \right]$$

$$\boxed{\frac{-5}{4} + \frac{1}{4}i} \quad -1.25 + i(-.25)$$

Math 1060 6.2.61

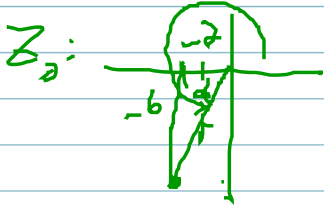
$z_1 = 4 + 7i$, $z_2 = -2 - 6i$, Find $z_1 z_2$ & $\frac{z_1}{z_2}$



$$r^2 = 4^2 + 7^2 = 65$$

$$r = \sqrt{65}$$

$$\tan \theta = \frac{7}{4} \quad \theta = \tan^{-1}\left(\frac{7}{4}\right) = 60.86^\circ$$



$$r^2 = (-6)^2 + (-2)^2 = 40$$

$$r = \sqrt{40} = 2\sqrt{10}$$

$$\tan \alpha = \frac{-6}{-2} = 3 \quad \alpha = \tan^{-1}(3)$$

$$\theta = 180^\circ + \tan^{-1}(3) = 251.57^\circ$$

$$z_1 z_2 = \sqrt{65} \cdot \sqrt{40} \left[\cos(\tan^{-1}\left(\frac{7}{4}\right) + 180^\circ + \tan^{-1}(3)) \right. \\ \left. + i \sin(\tan^{-1}\left(\frac{7}{4}\right) + 180^\circ + \tan^{-1}(3)) \right]$$

$$= 34 + -38i = \boxed{34 - 38i}$$

34.01 - 37.99i

$$\frac{z_1}{z_2} = \frac{\sqrt{65}}{\sqrt{40}} \left[\cos(\tan^{-1}\left(\frac{7}{4}\right) - (180^\circ + \tan^{-1}(3))) \right. \\ \left. + i \sin(\tan^{-1}\left(\frac{7}{4}\right) - (180^\circ + \tan^{-1}(3))) \right]$$

$$\boxed{\frac{-5}{4} + \frac{1}{4}i} \quad -1.25 + i(-.25)$$

