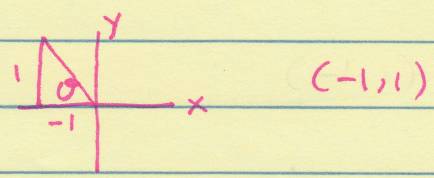


$$r = \sqrt{1+1} = \sqrt{2}$$

$$\theta = 180^\circ - \tan^{-1}\left(\frac{1}{1}\right) = 180^\circ - 45^\circ = 135^\circ$$

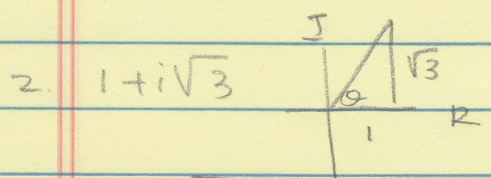
$$\sqrt{2} \text{ cis } 135^\circ$$



$$r = \sqrt{1+1} = \sqrt{2}$$

$$\theta = 180^\circ - \tan^{-1}\left(\frac{1}{1}\right) = 180^\circ - 45^\circ = 135^\circ$$

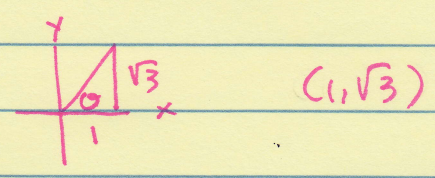
$$(\sqrt{2}, 135^\circ)$$



$$r = \sqrt{1+3} = 2$$

$$\theta = \tan^{-1}\left(\frac{\sqrt{3}}{1}\right) = 60^\circ$$

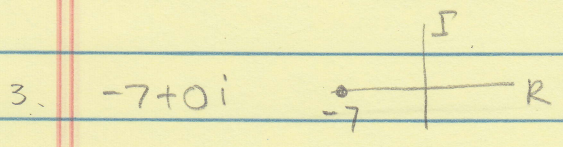
$$2 \text{ cis } 60^\circ$$



$$r = \sqrt{1+3} = 2$$

$$\theta = \tan^{-1}\left(\frac{\sqrt{3}}{1}\right) = 60^\circ$$

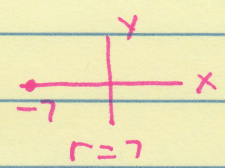
$$(2, 60^\circ)$$



$$r = 7$$

$$\theta = 180^\circ$$

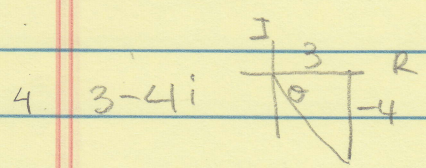
$$7 \text{ cis } 180^\circ$$



$$r = 7$$

$$\theta = 180^\circ$$

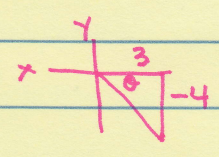
$$(7, 180^\circ)$$



$$r = \sqrt{9+16} = 5$$

$$\theta = 360^\circ - \tan^{-1}\left(\frac{4}{3}\right) = 307^\circ$$

$$5 \text{ cis } 307^\circ$$



$$r = \sqrt{9+16} = 5$$

$$\theta = 360^\circ - \tan^{-1}\left(\frac{4}{3}\right) = 307^\circ$$

$$(5, 307^\circ)$$

5. $6 \text{ cis } 100^\circ$

$$6 (\cos 100^\circ + i \sin 100^\circ)$$

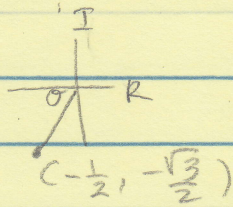
$$-1.04 + 5.91 i$$

$$(6, 100^\circ)$$

$$x = 6 \cos 100^\circ ; y = 6 \sin 100^\circ$$

$$(-1.04, 5.91)$$

6 $9 \cos \frac{4\pi}{3}$

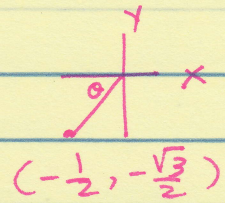


$$9 \left(\cos \frac{4\pi}{3} + i \sin \frac{4\pi}{3} \right)$$

$$9 \left(-\frac{1}{2} \right) + 9i \left(-\frac{\sqrt{3}}{2} \right)$$

$$-\frac{9}{2} - \frac{9\sqrt{3}}{2}i$$

$(9, \frac{4\pi}{3})$



$$x = 9 \cos \frac{4\pi}{3} = 9 \left(-\frac{1}{2} \right) = -\frac{9}{2}$$

$$y = 9 \sin \frac{4\pi}{3} = 9 \left(-\frac{\sqrt{3}}{2} \right) = -\frac{9\sqrt{3}}{2}$$

$$\left(-\frac{9}{2}, -\frac{9\sqrt{3}}{2} \right)$$

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13 $(5 \cos 30^\circ)(2 \sin 60^\circ)$

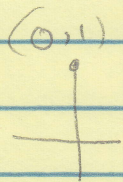
$$(5)(2) \cos(30^\circ + 60^\circ)$$

$$10 \cos 90^\circ$$

$$10 (\cos 90^\circ + i \sin 90^\circ)$$

$$10(0) + 10i(1)$$

$$= 10i$$



⑮ $(8 \cos \frac{\pi}{3}) \left(\frac{1}{2} \cos(-\frac{2\pi}{3}) \right)$

$$(8) \left(\frac{1}{2} \right) \cos \left(\frac{\pi}{3} + \frac{-2\pi}{3} \right)$$

$$4 \cos \left(-\frac{\pi}{3} \right)$$

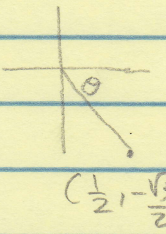
$$4 \cos \left(-\frac{\pi}{3} + 2\pi \right)$$

$$4 \cos \left(\frac{5\pi}{3} \right)$$

$$4 \left(\cos \frac{5\pi}{3} + i \sin \frac{5\pi}{3} \right)$$

$$4 \left(\frac{1}{2} \right) + 4i \left(-\frac{\sqrt{3}}{2} \right)$$

$$2 - 2\sqrt{3}i$$

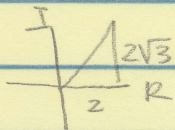


17 $z_1 = 2 + 2i\sqrt{3}; z_2 = \sqrt{3} - i$

$$(2 + 2i\sqrt{3})(\sqrt{3} - i)$$

$$2\sqrt{3} - 2i + 6i - 2i^2\sqrt{3}$$

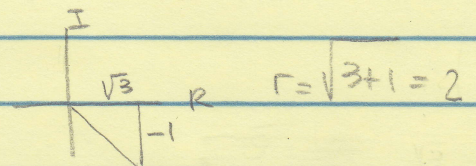
$$2\sqrt{3} + 4i + 2\sqrt{3} = 4\sqrt{3} + 4i$$



$$r = \sqrt{2^2 + 4} = 4$$

$$\theta_1 = \tan^{-1} \left(\frac{2\sqrt{3}}{2} \right) = \tan^{-1}(\sqrt{3}) = 60^\circ$$

$$z_1 = 4 \cos 60^\circ$$



$$r = \sqrt{3+1} = 2$$

$$\theta_2 = 360^\circ - \tan^{-1} \left(\frac{1}{\sqrt{3}} \right)$$

$$= 360^\circ - 30^\circ = 330^\circ$$

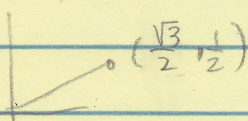
$$z_2 = 2 \cos 330^\circ$$

$$z_1 z_2 = (4 \cos 60^\circ)(2 \cos 330^\circ) = 8 \cos(330^\circ + 60^\circ)$$

$$= 8 \cos 390^\circ = 8 \cos(390^\circ - 360^\circ) = 8 \cos 30^\circ$$

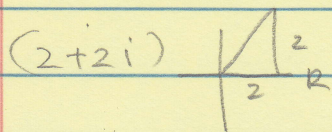
$$8(\cos 30^\circ + i \sin 30^\circ)$$

$$8 \left(\frac{\sqrt{3}}{2} \right) + 8i \left(\frac{1}{2} \right) = 4\sqrt{3} + 4i$$



$$19. (2+2i)(2-2i) = 4 - 4i + 4i - 4i^2$$

$$= 4 + 4 = 8$$



$$r = \sqrt{4+4} = 2\sqrt{2}$$

$$\theta = \tan^{-1}\left(\frac{2}{2}\right) = 45^\circ$$

$$2\sqrt{2} \operatorname{cis} 45^\circ$$

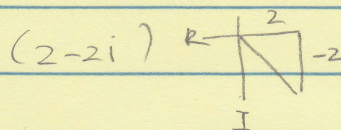
$$(2\sqrt{2} \operatorname{cis} 45^\circ)(2\sqrt{2} \operatorname{cis} 315^\circ)$$

$$(2\sqrt{2})(2\sqrt{2}) \operatorname{cis} (45^\circ + 315^\circ)$$

$$8 \operatorname{cis} 360^\circ = 8 \operatorname{cis} 0^\circ$$

$$8(\cos 0^\circ + i \sin 0^\circ)$$

$$8(1) + 8i(0) = 8$$



$$r = \sqrt{4+4} = 2\sqrt{2}$$

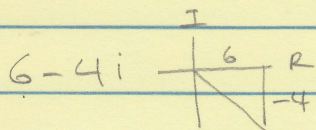
$$\theta = 360^\circ - \tan^{-1}\left(\frac{2}{2}\right) = 315^\circ$$

$$2\sqrt{2} \operatorname{cis} 315^\circ$$

$$+ \cdot (1, 0)$$

$$21. (6-4i)(-5+2i) = -30 + 12i + 20i - 8i^2$$

$$= -30 + 32i + 8 = -22 + 32i$$



$$r = \sqrt{36+16} = \sqrt{52} = 2\sqrt{13}$$

$$\theta = 360^\circ - \tan^{-1}\left(\frac{4}{6}\right) = 326.31^\circ$$

$$(2\sqrt{13} \operatorname{cis} 326.31^\circ)(\sqrt{29} \operatorname{cis} 158.199^\circ)$$

$$38.83297568 \operatorname{cis} 484.508523$$

$$(38.83297568 \cos 484.508523^\circ) + i(38.83297568 \sin 484.508523^\circ)$$

$$-22 + 32i$$

Keep precise values on your calculator.