

Homework #57

Answers

From Houghton-Mifflin Precalculus

3rd Edition

p475-476:

$$50) [(3/2)(\cos(\pi/6) + i \sin(\pi/6))][6(\cos(\pi/4) + i \sin(\pi/4))] \\ = 9(\cos(5\pi/12) + i \sin(5\pi/12))$$

$$51) [(5/3)(\cos 140^\circ + i \sin 140^\circ)][(2/3)(\cos 60^\circ + i \sin 60^\circ)] \\ = (10/9)(\cos 200 + i \sin 200)$$

$$54) (\cos 5^\circ + i \sin 5^\circ)(\cos 20^\circ + i \sin 20^\circ) = \cos 25^\circ + i \sin 25^\circ$$

$$55) \frac{\cos 50^\circ + i \sin 50^\circ}{\cos 20^\circ + i \sin 20^\circ} = \cos 30^\circ + i \sin 30^\circ$$

$$56) \frac{5(\cos 4.3 + i \sin 4.3)}{4(\cos 2.1 + i \sin 2.1)} = 1.25(\cos 2.2 + i \sin 2.2)$$

$$60) \frac{9(\cos 20 + i \sin 20)}{5(\cos 75 + i \sin 75)} = 1.8(\cos(-55) + i \sin(-55)) \\ = 1.8(\cos 305 + i \sin 305)$$

$$61)a) r = \sqrt{4 + 4} = 2\sqrt{2} \quad \tan \theta = 2/2 = 1; \theta = 45^\circ \quad 2 + 2i = 2\sqrt{2}(\cos 45^\circ + i \sin 45^\circ)$$

$$r = \sqrt{1 + 1} = \sqrt{2} \quad \tan \theta = -1/1 = -1; \theta = 315^\circ \quad 1 - i = \sqrt{2}(\cos 315^\circ + i \sin 315^\circ)$$

$$b) [2\sqrt{2}(\cos 45^\circ + i \sin 45^\circ)][\sqrt{2}(\cos 315^\circ + i \sin 315^\circ)] \\ = 4(\cos 360^\circ + i \sin 360^\circ) = 4(1) + 4(0)i = 4$$

$$c) (2 + 2i)(1 - i) = 2 - 2i + 2i - 2i^2 = 4$$

$$65)a) r = \sqrt{25 + 0} = 5 \quad \tan \theta = 0/5 = 0; \theta = 0^\circ \quad 5 = 5(\cos 0^\circ + i \sin 0^\circ)$$

$$r = \sqrt{4 + 9} = \sqrt{13} \quad \tan \theta = 3/2; \theta = 56^\circ \quad 2 + 3i = \sqrt{13}(\cos 56^\circ + i \sin 56^\circ)$$

$$b) [5(\cos 0^\circ + i \sin 0^\circ)]/[\sqrt{13}(\cos 56^\circ + i \sin 56^\circ)] = 5/\sqrt{13}(\cos(-56^\circ) + i \sin(-56^\circ)) \\ = 5/\sqrt{13}(.5592 - .8290i) = .77 - 1.15i$$

$$c) \frac{5}{2 + 3i} \cdot \frac{2 - 3i}{2 - 3i} = \frac{10 - 15i}{4 + 9} = \frac{10 - 15i}{13} = .77 - 1.15i$$