

Homework #58

Answers

From Houghton-Mifflin Precalculus 3rd Edition

p476:

$$72) (2 + 2i)^6 \quad r = \sqrt{4 + 4} = 2\sqrt{2} \quad \tan \theta = 2/2 = 1; \theta = 45^\circ$$

$$[2\sqrt{2}(\cos 45^\circ + i \sin 45^\circ)]^6 = (64)(8)[\cos (45^\circ)(6) + i \sin (45^\circ)(6)]$$

$$= 512(\cos 270^\circ + i \sin 270^\circ) = 512(0 - 1i) = -512i$$

$$73) (-1 + i)^{10} \quad r = \sqrt{1 + 1} = \sqrt{2} \quad \tan \theta = 1/(-1) = -1 \text{ (Quadrant II); } \theta = 135^\circ$$

$$[\sqrt{2}(\cos 135^\circ + i \sin 135^\circ)]^{10} = 32[\cos (135^\circ)(10) + i \sin (135^\circ)(10)]$$

$$= 32(\cos 1350^\circ + i \sin 1350^\circ) = 32(\cos 270^\circ + i \sin 270^\circ)$$

$$= 32(0 - 1i) = -32i$$

$$75) 2(\sqrt{3} + i)^5 \quad r = \sqrt{1 + 3} = 2 \quad \tan \theta = 1/\sqrt{3}; \theta = 30^\circ$$

$$2[2(\cos 30^\circ + i \sin 30^\circ)]^5 = 2[32(\cos (30^\circ)(5) + i \sin (30^\circ)(5))]$$

$$= 64(\cos 150^\circ + i \sin 150^\circ) = 64(-\sqrt{3}/2 + \frac{1}{2}i) = -32\sqrt{3} + 32i$$

$$77) [5(\cos 20^\circ + i \sin 20^\circ)]^3 = 125(\cos 60^\circ + i \sin 60^\circ)$$

$$= 125(\frac{1}{2} + (\sqrt{3}/2)i) = 125/2 + (125i\sqrt{3})/2$$

$$78) [3(\cos 150^\circ + i \sin 150^\circ)]^4 = 81(\cos 600^\circ + i \sin 600^\circ) =$$

$$81(\cos 240^\circ + i \sin 240^\circ) = 81(-\frac{1}{2} + (-\sqrt{3}/2)i) = -81/2 - (81i\sqrt{3})/2$$

p408:

$$13) \sin 195^\circ = \sin (225^\circ - 30^\circ) = \sin 225^\circ \cos 30^\circ - \cos 225^\circ \sin 30^\circ =$$

$$\frac{(-\sqrt{2}/2)(\sqrt{3}/2) - (-\sqrt{2}/2)(1/2)}{4} = \frac{-\sqrt{6} + \sqrt{2}}{4}$$

$$\cos 195^\circ = \cos (225^\circ - 30^\circ) = \cos 225^\circ \cos 30^\circ + \sin 225^\circ \sin 30^\circ =$$

$$\frac{(-\sqrt{2}/2)(\sqrt{3}/2) + (-\sqrt{2}/2)(1/2)}{4} = \frac{-\sqrt{6} - \sqrt{2}}{4}$$

$$\tan 195^\circ = \tan (225^\circ - 30^\circ) = \frac{\tan 225^\circ - \tan 30^\circ}{1 + \tan 225^\circ \tan 30^\circ} = \frac{1 - (\sqrt{3}/3)}{1 + (1)(\sqrt{3}/3)} =$$

$$= \frac{1 - (\sqrt{3}/3)}{1 + (\sqrt{3}/3)} = \frac{3 - \sqrt{3}}{3 + \sqrt{3}}$$