Precalculus Worksheet #3 Unit 6 Selected Solutions

Express each of the following complex numbers using trigonometric form. Express all angles in radians in terms of π, exact value please.

1. $4 + 4\sqrt{3}\,i = \boxed{8\left(\cos\left(\frac{\pi}{3}\right) + i\sin\left(\frac{\pi}{3}\right)\right)}$

$r = \sqrt{4^2 + (4\sqrt{3})^2}$ $\qquad \theta = \arctan\left(\frac{4\sqrt{3}}{4}\right)$

$r = \sqrt{16 + 48}$ $\qquad \theta = \arctan(\sqrt{3})$

$r = 8$ $\qquad \theta = \frac{\pi}{3}$

Express each of the following complex numbers using standard form (exact values please).

3. $10(\cos(\pi/6) + i\sin(\pi/6)) = a + bi$

$a = r\cos\theta$ $\qquad b = r\sin\theta$

$r = 10$ $\qquad \theta = \pi/6$

$a = 10\cos\left(\frac{\pi}{6}\right) = 5\sqrt{3}$

$b = 10\sin\left(\frac{\pi}{6}\right) = 5$

$\boxed{5\sqrt{3} + 5i}$

Perform the indicated operations. Express your answers using trigonometric form (exact values please).

5. $[7(\cos(\pi/4) + i\sin(\pi/4))][5(\cos(\pi/3) + i\sin(\pi/3))] = 35(\cos(7\pi/12) + i\sin(7\pi/12))$