Name _____ Date _____

Directions: Convert each expression into a complex number in the form $a + bi$

1) $\frac{1+2i}{3-4i}$

2) $\frac{5+2i}{\sqrt{3+4i}}$

3) $\frac{9}{\sqrt{7+24i}}$

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

5) $\left(\frac{1-i}{1+i}\right)^4$

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

Challenge Problems

Directions: These are optional bonus problems you may attempt if you desire.

C1) Prove that if z_0 is a root of the polynomial equation $z^n + a_1 z^{n-1} + a_2 z^{n-2} + \cdots + a_n = 0$, with $z = a + bi$ and $a_n \in \mathbb{R}$ (meaning that z is complex and all coefficients a_n are real), then $\overline{z_0}$ (the complex conjugate of z_0) is also a root of the equation.

Hint: Recall that the conjugate of a real number is the number itself.

Hint: Recall that the product of two conjugates is the same as the conjugate of their product.