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.

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| **C1)** Prove that if $z\_{0}$ is a root of the polynomial equation $z^{n}+a\_{1}z^{n-1}+a\_{2}z^{n-2}+…+a\_{n}=0$, with $z=a+bi$ and $a\_{n}\in R$ (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.* |
|  |