Lesson 7: Complex Number Division

Classwork

Opening Exercise

Perform the indicated operations. Write your answer in $a+bi$ form. Identify the real part of your answer and the imaginary part of your answer.

* 1. $\left(2+3i\right)+(-7-4i)$
	2. $i^{2}(-4i)$
	3. $3i-(-2+5i)$
	4. $(3-2i)(-7+4i)$
	5. $(-4-5i)(-4+5i)$

Exercises

1. What is the multiplicative inverse of $2i$?
2. Find the multiplicative inverse of $5+3i$.

State the conjugate of each number, and then using the general formula for the multiplicative inverse of $z=a+bi$, find the multiplicative inverse.

1. $3+4i$
2. $7-2i$
3. $i$
4. $2$
5. Show that $a=-1+\sqrt{3}i$ and $b=2$ satisfy $\frac{1}{a+b}=\frac{1}{a}+\frac{1}{b}$.

Problem Set

1. State the conjugate of each complex number. Then find the multiplicative inverse of each number, and verify by multiplying by $a+bi$ and solving a system of equations.
	1. $-5i$
	2. $5-\sqrt{3}i$
2. Find the multiplicative inverse of each number, and verify using the general formula to find multiplicative inverses of numbers of the form $z=a+bi$.
	1. $i^{3}$
	2. $\frac{1}{3}$
	3. $\frac{\sqrt{3} - i}{4}$
	4. $1+2i$
	5. $4-3i$
	6. $2+3i$
	7. $-5-4i$
	8. $-3+2i$
	9. $\sqrt{2}+i$
	10. $3-\sqrt{2}∙i$
	11. $\sqrt{5}+\sqrt{3}∙i$
3. Given $z\_{1}=1+i$ and $z\_{2}=2+3i$.
	1. Let $w=z\_{1}⋅z\_{2}$. Find $w$ and the multiplicative inverse of $w$.
	2. Show that the multiplicative inverse of $w$ is the same as the product of the multiplicative inverses of $z\_{1}$ and $z\_{2}$.