Homework 1.2: Imaginary and Complex Numbers

Name: Key!

Math 3

Simplify the imaginary numbers. (No exponents!)

1) $(i)^{23}$ $-i$

2) $(i)^{113}$ i

Write the numbers using the imaginary unit, i.

3) $\sqrt{-15}$ $i\sqrt{15}$

4) $-\sqrt{-4}$ $-2i$

Simplify. Write your final answer in standard form.

5) $(-9 - i) - (-2 - 3i)$ $-7+2i$

6) $(8 + 3i) - (10 + i)$ $-2+2i$

7) $(-6 - 10i) - (-4 - i)$ $-2-9i$

8) $(-10 - 10i) + (-4 - 10i)$ $-14-20i$

Simplify.

9) $(8 - 2i)(5 + 2i)$

10) $(7 + i)(-4 + 3i)$ $-31+17i$

11) $(-3 + 7i)(6 + 5i)$

12) $(-8 + 8i)(-5 + 8i)$ $-24-104i$

13) $(1 - 4i)(8 + 4i)$

14) $4(3i)(5 + 7i)$ $-84+60i$

15) $(-2 - 2i)(-8 - i)$

16) $(7 - 6i)(-1 - 2i)$ $-19-8i$

More on the back!

17) $\frac{-5-9i}{9+8i}$

18) $\frac{-4+10i}{3+4i}$

$\frac{28+46i}{25}$

19) $\frac{-5-3i}{7-10i}$

20) $\frac{-3-7i}{7+10i}$

$-\frac{91-19i}{149}$

21) $\frac{-1+i}{-5i}$

22) $\frac{-6-i}{i}$

$\frac{1-6i}{-1}$ or $-1+6i$

23) $\frac{2+5i}{-i}$

24) $\frac{-4-4i}{4i}$

$\frac{1-i}{-1}$ or $-1+i$

Homework 1.2 #1-8, 10-24 even

1. $i^{23} = i(i^{22}) = i(i^2)^{11} = i(-1)^{11} = -i$

2. $i^{113} = i(i^{112}) = i(i^2)^{56} = i(-1)^{56} = i$

3. $i\sqrt{15}$

4. $-1\sqrt{-4} = -i\sqrt{4} = -2i$

5. $(-9-i)-(-2-3i)$
$-9-i+2+3i$
$-7+2i$

6. $(8+3i)-(10+i)$
$8+3i-10-i$
$-2+2i$

7. $(-6-10i)-(-4-i)$
$-6-10i+4+i$
$-2-9i$

8. $(-10-10i)+(-4-10i)$
$-10-10i-4-10i$
$-14-20i$

10. $(7+i)(-4+3i)$
$-28+21i-4i+3i^2$
$-31+17i$

12. $(-8+8i)(-5+8i)$
$40-64i-40i+64i^2$
$-24-104i$

14. $4(3i)(5+7i)$
$12i(5+7i)$
$60i+84i^2$
$-84+60i$

16. $(7-6i)(-1-2i)$
$-7-14i+6i+12i^2$
$-19-8i$

18. $\frac{(-4+10i)}{(3+4i)} \cdot \frac{(3-4i)}{(3-4i)} = \frac{-12+16i+30i-40i^2}{9-12i+12i-16i^2} = \frac{28+40i}{25}$

20. $\frac{(-3-7i)}{(7+10i)} \cdot \frac{(7-10i)}{(7-10i)} = \frac{-21+30i-49i+70i^2}{49-70i+70i-100i^2} = \frac{-91-19i}{149}$

22. $\frac{(-6-i)}{i} \cdot \frac{i}{i} = \frac{-6i-i^2}{i^2} = \frac{1-6i}{-1}$ or $-1+6i$

24. $\frac{(-4-4i)}{4i} \cdot \frac{i}{i} = \frac{-4i-4i^2}{4i^2} = \frac{4-4i}{-4} = \frac{1-i}{-1}$ or $-1+i$