

# Complex Numbers Homework

Key

1. Simplify:  $\sqrt{-234}$

$$3i\sqrt{13 \cdot 2} = 3i\sqrt{26}$$

$$\begin{array}{r} 234 \\ \wedge \\ 117 \cdot 2 \\ \wedge \\ (3) \cdot 39 \\ \wedge \\ 13 \cdot (3) \end{array}$$

$$\begin{array}{r} \sqrt{-1} \\ \downarrow \\ i \end{array}$$

2. Simplify:  $3\sqrt{-56}$

$$3 \cdot 2i \sqrt{7 \cdot 2} = 6i\sqrt{14}$$

$$\begin{array}{r} 56 \\ \wedge \\ 7 \cdot 8 \\ \wedge \\ 4 \cdot 2 \\ \wedge \\ (2) \cdot (2) \end{array}$$

$$\begin{array}{r} \sqrt{-1} \\ \downarrow \\ i \end{array}$$

3.  $2i\sqrt{-25} = 2i \cdot 5i = 10i^2 = -10$

4.  $5i + 7i(i) = 5i + 7i^2 = 5i + 7(-1) = 5i - 7$

5.  $(8 - 3i)^2 = (8 - 3i)(8 - 3i) = 64 - 24i - 24i + 9i^2 = 64 - 48i - 9$

$$= 55 - 48i$$

6.  $6i \cdot -4i + 8 = -24i^2 + 8 = 24 + 8 = 32$

7.  $2i + 4(3i - 6) = 2i + 12i - 24 = 14i - 24$

8.  $\frac{(4 - 9i) \cdot i}{-6i \cdot i} = \frac{4i - 9i^2}{-6i^2} = \frac{4i + 9}{6}$

9.  $\frac{i}{-2 - 8i} = \frac{-i - 4}{34}$

10.  $\frac{(-10 - 5i)(-6 + 6i)}{(-6 + 6i)(-6 - 6i)} = \frac{60 + 30i + 60i + 30i^2}{36 - 36i + 36i - 36i^2} = \frac{60 + 90i + 30i^2}{36 - 36i^2} = \frac{60 + 90i - 30}{36 + 36} = \frac{30 + 90i}{72} = \frac{5 + 15i}{12}$