## Unit 3 Lesson 14: More Arithmetic with Complex Numbers

### 1 Which One Doesn’t Belong: Complex Expressions (Warm up)

#### Student Task Statement

Which one doesn’t belong?

A. $i^{2}$

B. $\left(1+i\right)+\left(1−i\right)$

C. $\left(1+i\right)^{2}$

D. $\left(1+i\right)\left(1−i\right)$

### 2 Powers of $i$ (Optional)

#### Student Task Statement

1. Write each power of $i$ in the form $a+bi$, where $a$ and $b$ are real numbers. If $a$ or $b$ is zero, you can ignore that part of the number. For example, $0+3i$ can simply be expressed as $3i$.
* $i^{0}$
* $i^{1}$
* $i^{2}$
* $i^{3}$
* $i^{4}$
* $i^{5}$
* $i^{6}$
* $i^{7}$
* $i^{8}$
1. What is $i^{100}$? Explain your reasoning.
2. What is $i^{38}$? Explain your reasoning.

### 3 Add 'Em Up (or Subtract or Multiply) (Optional)

#### Student Task Statement

For each row, your partner and you will each rewrite an expression so it has the form $a+bi$, where $a$ and $b$ are real numbers. You and your partner should get the same answer. If you disagree, work to reach agreement.

| partner A | partner B |
| --- | --- |
| $\left(7+9i\right)+\left(3−4i\right)$ | $5i\left(1−2i\right)$ |
| $2i\left(3+4i\right)$ | $\left(1+2i\right)−\left(9−4i\right)$ |
| $\left(4−3i\right)\left(4+3i\right)$ | $\left(5+i\right)+\left(20−i\right)$ |
| $\left(2i\right)^{4}$ | $\left(3+i\sqrt{7}\right)\left(3−i\sqrt{7}\right)$ |
| $\left(1+i\sqrt{5}\right)−\left(-7−i\sqrt{5}\right)$ | $\left(-2i\right)\left(-\sqrt{5}+4i\right)$ |
| $\left(\frac{1}{2}i\right)\left(\frac{1}{3}i\right)\left(\frac{3}{4}i\right)$ | $\left(\frac{1}{2}i\right)^{3}$ |



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