**3.3 - Complex Numbers ⸱ Form A**

**All work must be completed, clearly, on a separate page. Circle/Box final answers only on WS. No work = No credit**

**Example 1**

**Simplify.**

**1.** $\sqrt{-63}$ **2.**$\sqrt{-24}$ **3.**$\sqrt{-99}$ **4.** $\sqrt{-6}⋅\sqrt{- 3}$ **5.**(3*i*)(–2*i*)(5*i*) **6.**4*i*(‒6*i*)2

**Example 3**

**Solve each equation.**

 **7.** 4*x*2 + 24 = 0 **8.** 7*x*2 + 84 = 0  **9 .** 8*x*2 + 96 = 0

**Example 4**

**Find the values of *x* and *y* that make each equation true.**

 **10.** *x* + 1 + 2*yi* = 3 – 6*i***11.** 5 + *y* + (3*x* – 7)*i* = 9 – 3*i*  **12.** *x* – 16*i*= 3 – (2*y*)*i*

**Example 5 and 6**

**Simplify.**

 **13.** (8 + 3*i*) – (6 – 2*i*) **14.** (–4 + 2*i*) + (6 – 3*i*) **15.**(–11 + 4*i*) – (1 – 5*i*) **16.**(5 – 2*i*)(4 – *i*)

**17. ELECTRICITY** Using the formula *V* = *CI*, find the voltage *V* in a circuit when the current
*C* = 3 – *j* amps and the impedance *I* = 3 + 2*j* ohms.

**Example 7**

**Simplify.**

 **18.** $\frac{7 - 13i}{2i}$

**Mixed Exercises**

**STRUCTURE Simplify.**

 **19.** (1 + *i*)(2 + 3*i*)(4 – 3*i*) **20.** $\frac{2 - i\sqrt{3}}{2 + i\sqrt{3}}$

 **21.** Simplify [(2 + *i*)*x*2 ‒ *ix* + 5 + *i*] ‒ [(‒3 + 4*i*)*x*2 + (5 ‒ 5*i*)*x* ‒ 6].

**ELECTRICITY Use the formula *V* = *CI*, where *V* is the voltage, *C* is the current, and *I* is
the impedance.**

 **22.** The voltage in a circuit is 24 ‒ 8*j* volts, and the impedance is 4 ‒ 2*j* ohms. What is the current?

**~~23. ELECTRICAL ENGINEERING~~** ~~standard electrical voltage in Europe is 220 volts.~~

**~~a.~~** ~~Find the impedance in a standard European circuit if the current is 22 – 11~~*~~i~~*~~amps.~~

**~~b.~~** ~~Find the current in a standard European circuit if the impedance is 10 – 5~~*~~i~~*~~ohms.~~

**~~c.~~** ~~Find the impedance in a standard European circuit if the current is 20~~*~~i~~*~~amps.~~

**24. FIND THE ERROR** Jose and Zoe are simplifying (2*i*)(3*i*)(4*i*). Is either of them correct?
Explain your reasoning.

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 **25. ANALYZE** Determine whether the following statement is *always*, *sometimes*, or *never* true. Explain your reasoning.

*Every complex number has both a real part and an imaginary part.*

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 **26. WRITE** Explain how complex numbers are related to quadratic equations.

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