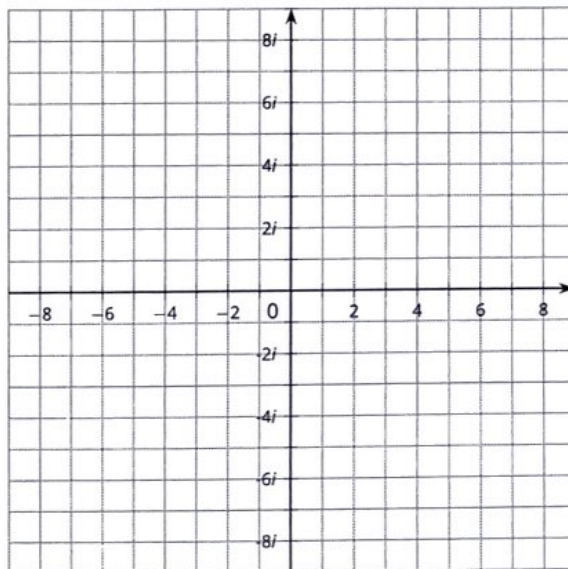*Solutions*

Lesson 12 Practice Problems

1. Write each expression in the form $a + bi$, where a and b are real numbers. You may plot the numbers in the complex plane as a guide.

   a. $2 \cdot \sqrt{-4}$ $= 2 \cdot 2i$
   $= 0 + 4i$

   b. $3i \cdot 2i$
   $= -6 + 0i$

   c. i^4 $= 1 + 0i$

   d. $4 - 3\sqrt{-1}$ $= 4 - 3i$

2. Which expression is equivalent to $(3 + 9i) - (5 - 3i)$?

   $= -2 + 12i$

   A. $-2 - 12i$

   B. $-2 + 12i$

   C. $15 + 27i$

   D. $15 - 27i$

3. What are a and b when you write $\sqrt{-16}$ in the form $a + bi$, where a and b are real numbers?

   $= 0 + 4i$

   A. $a = 0, b = -4$

   B. $a = 0, b = 4$

   C. $a = -4, b = 0$

   D. $a = 4, b = 0$

4. Fill in the boxes to make a true statement:

$$(\boxed{22} - 3i) - (15 + \boxed{9}i) = 7 - 12i$$

5. Plot each number on the real number line, or explain why the number is not on the real number line.
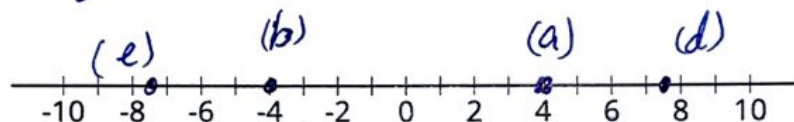
a. $\sqrt{16}$ $= 4$

b. $-\sqrt{16}$ $= -4$

c. $\sqrt{-16}$ $= 4i$ imaginary, not real

d. $56^{1/2}$ $= \sqrt{4}\sqrt{14} = 2\sqrt{14}$

e. $-56^{1/2}$ $= -2\sqrt{14}$

f. $(-56)^{1/2}$ $= \pm\sqrt{14}\,i$ imaginary, not real

(e)   (b)   (a)   (d)

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|   |  | |  |  | |  | | |  |  | | | |  |
 -10  -8  -6  -4  -2  0  2  4  6  8  10
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(From Unit 3, Lesson 10.)

6. Which expression is equivalent to $\sqrt{-4}$? $= 2i$

A. $-2i$

B. $-4i$

C. $2i$ ⟵ (circled)

D. $4i$

(From Unit 3, Lesson 11.)