Name ________________________ Date ______________ Class______________

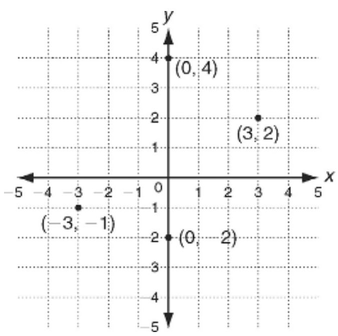
LESSON 13-2

Reading Strategies

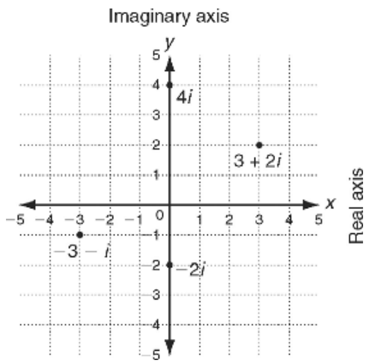
Use a Model

Complex numbers can be graphed on a **complex plane.** Use the coordinate plane as a model. In a complex plane, the horizontal axis represents real numbers, and the vertical axis represents imaginary numbers.

The ordered pairs (0, –2), (–3, –1), (0, 4), and (3, 2) can be graphed on the coordinate grid.



The complex numbers $-2i$, $-3 - i$, $4i$, and $3 + 2i$ can be graphed on the complex plane.



Answer each question.

1. Identify the location of each point on the complex plane below.

   a. *A* ________________________

   b. *B* ________________________

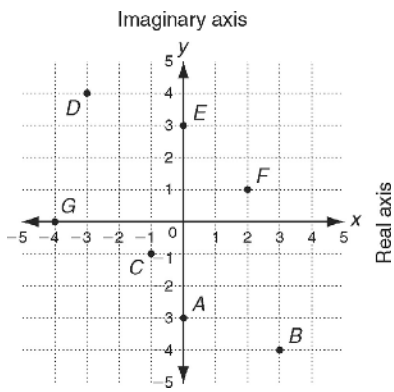
   c. *C* ________________________

   d. *D* ________________________

   e. *E* ________________________

   f. *F* ________________________

   g. *G* ________________________



2. Describe the location of the complex number $5 + \sqrt{-4}$ in the complex plane.

   ____

3. How far from the origin is $-1 + i$? Explain how you know.

   ____

4. Explain why the complex numbers $2 + 3i$ and $2 - 3i$ are the same distance from the origin.

   ____

3. The answers are the same. Yes; this will always be true in the system of real numbers. The order of operations can be reversed in this case; yes

4. $\sqrt{3}i \cdot \sqrt{12}i = \sqrt{3} \cdot \sqrt{12} \cdot i^2 = \sqrt{36}i^2$
   $= 6 \cdot -1 = -6; \sqrt{36} = 6$

5. The answers are different. The order of operations cannot be changed in this case.

6. Possible answer: When multiplying radicals that have negative radicands, first simplify the radical using the imaginary number *i,* and then find the product.

7. –32
8. 12
9. –5
10. $-30i$
11. $6i$
12. $4i\sqrt{2}$

Problem Solving

1.

n	$Z_{n+1} = (Z_n)^2 + c$	Z_n
1	$Z_1 = 1 + 2i$	$Z_1 = 1 + 2i$
2	$Z_2 = (1 + 2i)^2 + 1$	$Z_2 = -2 + 4i$
3	$Z_3 = (-2 + 4i)^2 + 1$	$Z_3 = -11 - 16i$
4	$Z_4 = (-11 - 16i)^2 + 1$	$Z_4 = -134 + 352i$

2. $(-13, -35i)$; possible answer: this point cannot be generated using the given formula.

3. D
4. B
5. A
6. C

Reading Strategies

1. a. $-3i$
   b. $3 - 4i$
   c. $-1 - i$
   d. $-3 - 4i$
   e. $3i$
   f. $2 + i$
   g. –4

2. $5 + \sqrt{-4} = 5 + 2i = 5 + 2i$; located 5 units to the right and two units up

3. $\sqrt{2}$; the point $(-1 + i)$ is one vertex of a right triangle with vertices at the origin and $(-1 + 0i)$. Each leg of the triangle equals 1. Using the Pythagorean Theorem, $1^2 + 1^2 = c^2$, $c^2 = 2$, $c = \sqrt{2}$.

4. The real value is the same for both, and $3i$ and $-3i$ are the same distance from the real number axis. So the distances to the origin are corresponding sides on congruent triangles.

Answers for Unit 5

14-1 FACTORING $x^2 + bx + c$

Practice A

1. 3; 2
2. 4; 1
3. 5; 4
4. $(x + 7)(x + 3)$
5. $(x + 6)(x + 5)$
6. $(x + 8)(x + 2)$
7. 6; 2
8. 5; 3
9. 16; 1
10. $(x - 9)(x - 3)$
11. $(x - 4)(x - 11)$
12. $(x - 8)(x - 5)$
13. 10; 4
14. 3; 1
15. 8; 4
16. 12; 2
17. 14; 2
18. 5; 2
19. $(x + 3)(x - 5)$
20. $(x + 2)(x - 10)$
21. $(x + 6)(x - 8)$
22. $(x + 3)(x - 4)$
23. $(x + 1)(x - 3)$
24. $(x + 1)(x - 2)$
25. 1; 5

n	$n^2 + 6n + 5$
0	$0^2 + 6(0) + 5 = 5$
1	$1^2 + 6(1) + 5 = 12$
2	$2^2 + 6(2) + 5 = 21$
3	$3^2 + 6(3) + 5 = 32$
4	$4^2 + 6(4) + 5 = 45$