Name _____ Date _____

LESSON 1.6

Practice A

For use with the lesson "Perform Operations with Complex Numbers"

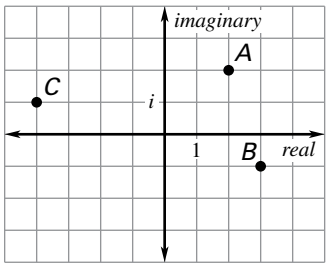
Solve the equation.

1. $x^2 = -25$ **2.** $x^2 = -49$ **3.** $x^2 + 9 = 0$

4. $x^2 + 9 = 5$ **5.** $x^2 - 16 = 20$ **6.** $-4x^2 + 20 = -6x^2 - 12$

Identify the complex numbers plotted in the complex plane.

7.



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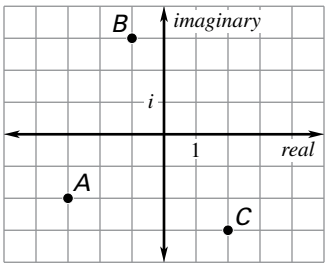


Write the expression as a complex number in standard form.

9. $(2 + i) + (3 + 2i)$ **10.** $(3 - 2i) + (1 + 4i)$

11. $(6 - i) - (3 + i)$ **12.** $(5 + i) - (3 - 5i)$

13. $i - (5 + 6i)$ **14.** $2i - (2 + 3i) + (1 - 8i)$

15. $2i(4 + i)$ **16.** $4i(3 - 2i)$

17. $-3i(-5 - 3i)$ **18.** $(1 + i)(2 + 5i)$

19. $(4 - 2i)(2 - 3i)$ **20.** $(5 + 3i)(4 - 4i)$

21. $(-3 + 4i)(3 - i)$ **22.** $(7 - i)(-3 - 4i)$

23. $\dfrac{2}{3 + i}$ **24.** $\dfrac{6}{2 - 3i}$

25. $\dfrac{1 - i}{2 + 2i}$ **26.** $\dfrac{2 - 2i}{4 - 3i}$

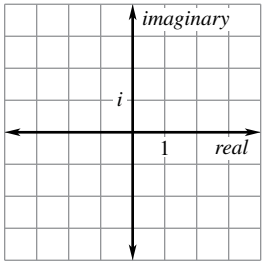
Find the absolute value of the complex number.

27. $1 + i$ **28.** $3 - i$ **29.** $5 + i$

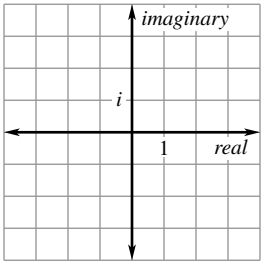
30. $1 - 2i$ **31.** $4 - 3i$ **32.** $2 + 6i$

Plot the numbers in a complex plane.

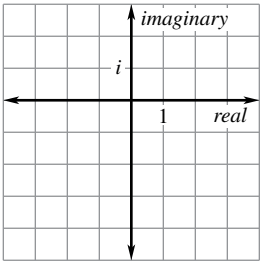
33. $2i$



34. $3 + 3i$



35. $-1 - 4i$



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Lesson 1.5 Solve Quadratic Equations by Finding Square Roots, continued

Challenge Practice

1. 0, 1, 4, 5, 6, 9 **a.** not possible **b.** possible **c.** possible **d.** not possible

2. a. $-\frac{33}{2\sqrt{3} - 12}$ **b.** $\frac{31}{10 + \sqrt{7}}$

c. $-\frac{1}{4\sqrt{5} - 4\sqrt{6}}$ **d.** $\frac{4}{9\sqrt{7} + 9\sqrt{3}}$

3. *Sample answer:* $x^2 - 80 = 0$

4. *Sample answer:* $(x + 1)^2 - 6 = 0$

5. From geometry, the Pythagorean Theorem states that $c = \sqrt{a^2 + b^2}$, where c is the length of the hypotenuse of a right triangle, and a and b are the lengths of the legs.

Then $\sqrt{a^2 + b^2} \neq a + b$ because c cannot be equal to $a + b$. Also note that a or b cannot be 0 because then there would not be a triangle.

6. a. $A = \pi R^2 - \pi r^2$ **b.** $R = \sqrt{\frac{A + \pi r^2}{\pi}}$

c. about 8 in. **d.** $R = 4$ produces a minimum area. This value does not make sense because if $R = 4$, then you would not have a ring.

Lesson 1.6 Perform Operations with Complex Numbers

Teaching Guide

1. $9 - 5i$ **2.** $-6 + 3i$ **3.** $6 + 4i$ **4.** $-6 - 9i$

5. $8 - 9i$ **6.** $7 + 24i$

Practice Level A

1. $\pm 5i$ **2.** $\pm 7i$ **3.** $\pm 3i$ **4.** $\pm 2i$ **5.** ± 6

6. $\pm 4i$ **7.** A: $2 + 2i$, B: $3 - i$, C: $-4 + i$

8. A: $-3 - 2i$, B: $-1 + 3i$, C: $2 - 3i$

9. $5 + 3i$ **10.** $4 + 2i$ **11.** $3 - 2i$ **12.** $2 + 6i$

13. $-5 - 5i$ **14.** $-1 - 9i$ **15.** $-2 + 8i$

16. $8 + 12i$ **17.** $-9 + 15i$ **18.** $-3 + 7i$

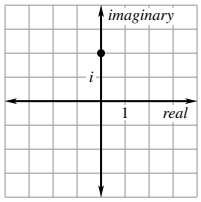
19. $2 - 16i$ **20.** $32 - 8i$ **21.** $-5 + 15i$

22. $-25 - 25i$ **23.** $\frac{3}{5} - \frac{1}{5}i$ **24.** $\frac{12}{13} + \frac{18}{13}i$

25. $-\frac{1}{2}i$ **26.** $\frac{14}{25} - \frac{2}{25}i$ **27.** $\sqrt{2}$ **28.** $\sqrt{10}$

29. $\sqrt{26}$ **30.** $\sqrt{5}$ **31.** 5 **32.** $2\sqrt{10}$

33.



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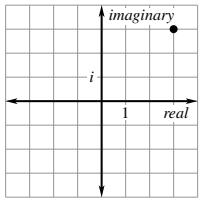

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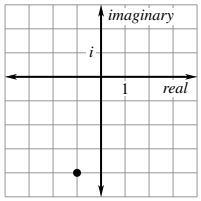


Practice Level B

1. $\pm 6i$ **2.** $\pm 11i$ **3.** $\pm i\sqrt{5}$ **4.** $\pm 2i$

5. $\pm 2i\sqrt{6}$ **6.** $\pm\frac{1}{4}i$ **7.** $3 \pm 2i\sqrt{3}$ **8.** $1 \pm 3i\sqrt{2}$

9. $-2 \pm 4i\sqrt{5}$ **10.** $4 + 2i$ **11.** $6 + 3i$

12. $-8 - 6i$ **13.** $2 - 9i$ **14.** $-6 + 12i$

15. $-2 - 6i$ **16.** $6 + 8i$ **17.** $-1 - 17i$

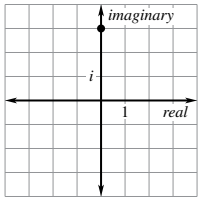
18. $-24 + 2i$ **19.** $10 + 2i$ **20.** $3 - 4i$ **21.** 34

22. $\frac{15}{13} + \frac{10}{13}i$ **23.** $\frac{2}{25} - \frac{11}{25}i$

24. $\frac{2 + \sqrt{2}}{3} + \frac{2\sqrt{2} - 1}{3}i$ **25.** $-\frac{27}{10} - \frac{7}{5}i$ **26.** 5

27. 2 **28.** $\sqrt{13}$

29.



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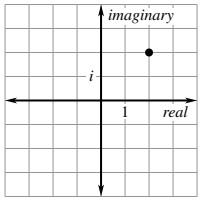

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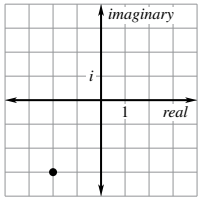

32. 1 **33.** $3 - i$ **34.** 4 **35.** $2 - i$ **36.** 2

37. 2 **38.** 2 **39.** 2 **40.** If the exponent of i is a factor of 4 the expression can be reduced to 1. To simplify i raised to any natural number, factor out the multiples of 4 in the exponent and simplify the remaining expression;

$2 + i^{207} = 2 + (i^{204})(i^3) = 2 + i^3 = 2 - i$

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