

EXTRA PRACTICE 27**Radical Expressions and Rational Numbers as Exponents**

Use after Sections 10.1 and 10.2

Name _____

Examples: a) Given $f(x) = \sqrt{3x - 16}$, find $f(7)$ and $f(3)$.

$$f(7) = \sqrt{3 \cdot 7 - 16} = \sqrt{21 - 16} = \sqrt{5}$$

$$f(3) = \sqrt{3 \cdot 3 - 16} = \sqrt{9 - 16} = \sqrt{-7}$$

Since $\sqrt{-7}$ is not a real number, we say $\sqrt{-7}$ does not exist.b) Rewrite $(a^3b^2)^{1/4}$ without fractional exponents.

$$(a^3b^2)^{1/4} = \sqrt[4]{a^3b^2}.$$

c) Simplify $x^{2/3} \cdot x^{1/4} = x^{8/12} \cdot x^{3/12} = x^{11/12} = \sqrt[12]{x^{11}}$.

For each function, find the function value if it exists.

1. $f(x) = \sqrt{3x + 5}$; $f(2)$, $f(6)$, $f(9)$, $f(-2)$ _____

2. $f(x) = \sqrt{6x - 10}$; $f(4)$, $f(-6)$, $f(5)$, $f(3)$ _____

3. $f(x) = \sqrt{4x + 8}$; $f(2)$, $f(-2)$, $f(3)$, $f(-3)$ _____

4. $f(x) = \sqrt[3]{5x + 6}$; $f(2)$, $f(-6)$, $f(3)$, $f(8)$ _____

5. $f(x) = \sqrt[3]{6x - 4}$; $f(-1)$, $f(3)$, $f(4)$, $f(-6)$ _____

6. $g(x) = \sqrt[4]{2x + 3}$; $g(0)$, $g(-2)$, $g(1)$, $g(2)$ _____

Simplify. Assume that variables can represent any real number.

7. $\sqrt{(-5)^2}$ _____

8. $\sqrt{16x^2}$ _____

9. $\sqrt{81x^3}$ _____

10. $\sqrt[3]{343x^3}$ _____

11. $\sqrt[3]{64z^3}$ _____

12. $\sqrt[3]{(-27)}$ _____

13. $\sqrt[7]{(-z)^7}$ _____

14. $\sqrt{4x^2 + 12x + 9}$ _____

15. $\sqrt{(2x + 3)^2}$ _____

16. $\sqrt[13]{(-6x)^{13}}$ _____

17. $\sqrt[3]{\frac{216}{343}}$ _____

18. $\sqrt[3]{-\frac{125}{729}}$ _____

19. $\sqrt[7]{\frac{128}{2187}}$ _____

20. $\sqrt[5]{(4ab)^5}$ _____

EXTRA PRACTICE 27**Radical Expressions and Rational Numbers as Exponents**Use after Sections 11.1 and 11.2

Find the domain of each of the following functions.

21. $f(x) = \sqrt{x-3}$ _____

22. $f(x) = \sqrt{2x+5}$ _____

23. $f(x) = \sqrt{x-9}$ _____

24. $f(x) = \sqrt[3]{3x-5}$ _____

25. $f(x) = 3 + \sqrt[4]{x-5}$ _____

26. $f(x) = 2 + \sqrt{2x+3}$ _____

Assume for all exercises that even roots are of nonnegative quantities and that all denominators are nonzero.

Rewrite without fractional exponents.

27. $y^{1/6}$ _____

28. $4^{1/2}$ _____

29. $32^{1/5}$ _____

30. $16^{3/2}$ _____

31. $(xy)^{1/6}$ _____

32. $(169x^3)^{1/2}$ _____

33. $64^{5/4}$ _____

34. $(16xy^2z)^{1/3}$ _____

35. $(625)^{3/4}$ _____

Rewrite with fractional exponents.

36. $\sqrt[3]{16}$ _____

37. $\sqrt[5]{x^2}$ _____

38. $\sqrt[3]{x^2y}$ _____

39. $(\sqrt{4xy})^3$ _____

40. $\sqrt[4]{10ab^3}$ _____

41. $(\sqrt[5]{abc^2})^3$ _____

42. $\sqrt[4]{x^2y^2}$ _____

43. $\sqrt{3x^2y^3}$ _____

44. $\sqrt[5]{x^3y^2z^5}$ _____

Simplify. Do not use negative exponents.

45. $y^{-3/4}$ _____

46. $(10x^2y)^{-3/2}$ _____

47. $\left(\frac{1}{64}\right)^{-1/2}$ _____

48. $\left(\frac{5a}{6bc}\right)^{-2/3}$ _____

49. $\frac{x^{-3/2}}{x^{-2/5}}$ _____

50. $x^{3/2} \cdot x^{2/5}$ _____

51. $(x^{-5/2} \cdot y^{2/3})^{1/3}$ _____

52. $(x^{5/6})^{1/3}$ _____

53. $(a^{3/5} \cdot b^{1/2})^{1/4}$ _____

54. $6^{3/5} \cdot 6^{1/5}$ _____

55. $4^{2/5} \cdot 4^{-3/2}$ _____

