6.2 Apply Properties of Rational Exponents

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EXAMPLE

Write the expression in simplest form. Assume all variables are positive.

a. $\sqrt[3]{48} = \sqrt[3]{8 \cdot 6} = \sqrt[3]{8} \cdot \sqrt[3]{6} = 2\sqrt[3]{6}$

b. $\left(\dfrac{x^4}{y^8}\right)^{1/2} = \dfrac{(x^4)^{1/2}}{(y^8)^{1/2}} = \dfrac{x^{4 \cdot 1/2}}{y^{8 \cdot 1/2}} = \dfrac{x^2}{y^4}$

EXERCISES

Write the expression in simplest form. Assume all variables are positive.

16. $\sqrt[3]{80}$

17. $(3^4 \cdot 5^4)^{-1/4}$

18. $(25a^{10}b^{16})^{1/2}$

19. $\sqrt{\dfrac{18x^5y^4}{49xz^3}}$

6.3 Perform Function Operations and Composition

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EXAMPLE

Let $f(x) = 3x^2 + 1$ and $g(x) = x + 4$. Perform the indicated operation.

a. $f(x) + g(x) = (3x^2 + 1) + (x + 4) = 3x^2 + x + 5$

b. $f(x) \cdot g(x) = (3x^2 + 1)(x + 4) = 3x^3 + 12x^2 + x + 4$

c. $f(g(x)) = f(x + 4) = 3(x + 4)^2 + 1 = 3(x^2 + 8x + 16) + 1 = 3x^2 + 24x + 49$

EXERCISES

Let $f(x) = 4x - 6$ and $g(x) = x + 8$. Perform the indicated operation.

20. $f(x) + g(x)$

21. $f(x) - g(x)$

22. $f(x) \cdot g(x)$

23. $f(g(x))$

6.4 Use Inverse Functions

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EXAMPLE

Find the inverse of the function $y = 3x + 7$.

$y = 3x + 7$ Write original function.

$x = 3y + 7$ Switch x and y.

$x - 7 = 3y$ Subtract 7 from each side.

$\dfrac{1}{3}x - \dfrac{7}{3} = y$ Divide each side by 3.

EXERCISES

Find the inverse of the function.

24. $y = \dfrac{1}{3}x + 4$

25. $y = 4x^2 + 9, \ x \geq 0$

26. $f(x) = x^3 - 4$

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