

Simplify the following radicals.

1.  $3\sqrt[4]{54x^7y} \left( 4\sqrt[4]{168x^3y^3} \right)$

2.  $\sqrt[3]{\frac{27}{21}}$

3.  $5\sqrt[3]{686} + \sqrt[3]{128}$

4.  $\sqrt[4]{32x^{16}y^{13}}$

Rewrite using exponents. (No simplifying necessary)

5.  $\left( \sqrt[4]{\left(\frac{1}{2}\right)} \right)^3$

6.  $\sqrt{343az^6}$

7.  $\left( \sqrt[5]{32a^3b^4} \right)^2$

Rewrite using radical notation. (No simplifying necessary)

8.  $(17)^{5/2}$

9.  $12lc^{3/7}d^{6/7}$

10.  $16p^{1/2}r^{3/4}$

Using exponent rules, simplify. No negative exponents should be left in final answer.

11.  $(-27)^{4/3}$

12.  $\left( \frac{64^{2/3}}{x^{-3}y^{1/2}} \right)^{1/3}$

13.  $x^{2/3} \cdot x^{1/2} \cdot x^{-1/4}$

14.  $\sqrt{x^{2/5}}$

15.  $\frac{x^{7/5}y \cdot xy^{1/3}}{x^{4/5}y^{1/4}}$

16.  $(16x^2)^{1/4} \cdot x^{2/3}$

17.  $\frac{x^{1/6}y^2}{x^{4/3}y^{2/5}}$

18.  $\left( x^{-3/5}y^{12} \right)^{-2/3}$

19.  $\frac{(625x^{12})^{1/4}}{x^{2/3}}$

20.  $\frac{4^{1/4}x^{2/3} \cdot 4^{9/4}x^4}{32^{3/2}x^{-1/2}}$

21.  $\left( \frac{169}{z^{12}} \right)^{-3/2}$

22.  $\left( 125x^{-2/3}y^8 \right)^{1/2} \cdot \sqrt[3]{5xy^2}$

Given  $f(x) = x^2 + 4x - 21$  and  $g(x) = 4x - 12$ , using the operations below, and write the new function  $h(x)$  and any domain restrictions.

23.  $(f + f)x$

24.  $(g - f)x$

25.  $(gf)x$

26.  $(f - g)x$

27.  $\left(\frac{f}{g}\right)x$

28.  $\left(\frac{g}{f}\right)x$

29.  $(f \circ g)x$

30.  $(g \circ g)x$

31.  $g(f(x))$

Given  $f(x) = 2x^2 - 5x + 18$  and  $g(x) = 7 - 2x$ , find each value.

32.  $(f - g)8$

33.  $(g \circ f)(-3)$

34.  $f(g(3))$

35.  $\left(\frac{g}{f}\right)(-1)$

Find the inverse function of the given function.

36.  $f(x) = -\frac{6}{5}x + 8$

37.  $f(x) = \left(\frac{1}{2}x + 6\right)^4 - 3$

38.  $f(x) = 5\sqrt[3]{x-7} + 10$

39.  $f(x) = \frac{-3}{x+7} + 4$

40.  $f(x) = -4(x+11)^{\frac{1}{2}} + 4$

Are  $f(x)$  and  $g(x)$  inverse functions? Verify algebraically. (Be able to show every little step!)

41.  $f(x) = \frac{1}{3}x + 6; g(x) = 3x - 18$

42.  $f(x) = \sqrt{\frac{x-4}{3}}; g(x) = 27x^2 + 4$

43.  $f(x) = \frac{1}{5}x^3; g(x) = \sqrt[3]{5x}$

Simplify the following radicals.

1.  $3\sqrt[4]{54x^7y} (4\sqrt[4]{168x^3y^3})$   $72x^2y\sqrt[4]{7x^2}$

2.  $\sqrt[3]{\frac{27}{21}}$   $\frac{\sqrt[3]{441}}{7}$

3.  $5\sqrt[3]{686} + \sqrt[3]{128}$   $39\sqrt[3]{2}$

4.  $\sqrt[4]{32x^{16}y^{13}} = 2x^4y^3\sqrt[4]{2y}$

Rewrite using exponents. (No simplifying necessary)

5.  $(\sqrt[4]{\frac{1}{2}})^3$   $(\frac{1}{2})^{3/4}$

6.  $\sqrt[7]{343az^6}$   $7^{3/2}a^{1/2}z^3$

7.  $(\sqrt[3]{32a^3b^4})^2$   $4a^{6/5}b^{8/5}$

Rewrite using radical notation. (No simplifying necessary)

8.  $(17)^{5/2}$   $\sqrt{(17)^5}$   
or  $289\sqrt{17}$

9.  $121c^{3/4}d^{6/7}$   $\sqrt[7]{11^{14}c^3d^6}$   
or  $121\sqrt[7]{c^3d^6}$

10.  $16p^{1/2}r^{3/4}$   $\sqrt[4]{2^6p^2r^3}$   
 $16\sqrt[4]{p^2r^3}$

Using exponent rules, simplify. No negative exponents should be left in final answer.

11.  $(-27)^{4/3}$   $81$

12.  $\left(\frac{64^{2/3}}{x^{-3}y^{1/2}}\right)^{1/3}$   $\frac{2^{4/3}x}{y^{1/6}}$

13.  $x^{2/3} \cdot x^{1/2} \cdot x^{-1/4}$   $x^{11/12}$

14.  $\sqrt{x^{2/5}}$   $x^{1/5}$

15.  $\frac{x^{7/5}y \cdot xy^{1/3}}{x^{4/5}y^{1/4}}$   $x^{8/5}y^{13/12}$

16.  $(16x^2)^{1/4} \cdot x^{2/3}$   $2x^{7/6}$

17.  $\frac{x^{1/6}y^2}{x^{4/3}y^{2/5}}$   $\frac{y^{8/5}}{x^{7/6}}$

18.  $(x^{-3/5}y^{12})^{-2/3}$   $\frac{x^{2/5}}{y^8}$

19.  $\frac{(625x^{12})^{1/4}}{x^{2/3}}$   $5x^{7/3}$

20.  $\frac{4^{1/4}x^{2/3} \cdot 4^{9/4}x^4}{32^{3/2}x^{-1/2}}$   $\frac{x^{31/6}}{2^{5/2}}$

21.  $\left(\frac{169}{z^{12}}\right)^{-3/2}$   $\frac{z^{18}}{2197}$

22.  $\left(125x^{-2/3}y^8\right)^{1/2} \cdot \sqrt[3]{5xy^2}$   $5^{1/6}x^{14/3}$

Given  $f(x) = x^2 + 4x - 21$  and  $g(x) = 4x - 12$ , using the operations below, and write the new function

$h(x)$  and any domain restrictions.

- (23)  $h(x) = 2x^2 + 8x - 42$       (24)  $h(x) = -x^2 + 9$       (25)  $h(x) = 4x^3 + 4x^2 - 132x + 252$   
 23.  $(f+f)x$       24.  $(g-f)x$       25.  $(gf)x$       26.  $(f-g)x$       27.  $\left(\frac{f}{g}\right)x$   
 (26)  $h(x) = 4x^3 + 4x^2 - 132x + 252$       (26)  $h(x) = x^2 - 9$   
 28.  $\left(\frac{g}{f}\right)x$       29.  $(f \circ g)x$       30.  $(g \circ g)x$       31.  $g(f(x))$   
 (27)  $h(x) = \frac{x+7}{4}$  where  $x \neq 3$       (28)  $h(x) = \frac{4}{x+7}$  where  $x \neq -7, 3$

Given  $f(x) = 2x^2 - 5x + 18$  and  $g(x) = 7 - 2x$ , find each value.

- (29)  $f(g(x)) = 16x^2 - 80x + 75$       (30)  $g(g(x)) = 16x - 60$   
 32.  $(f-g)8$       33.  $(g \circ f)(-3)$       34.  $f(g(3))$       35.  $\left(\frac{g}{f}\right)(-1)$   
 (31)  $g(f(x)) = 4x^2 + 16x - 96$       ~~32~~ 115      ~~33~~ 4.8      (32) 115      (33) -9      (34) 15      (35)  $\frac{9}{25}$  or 0.36

Find the inverse function of the given function.

36.  $f(x) = -\frac{6}{5}x + 8$

$y^{-1} = -\frac{5}{6}x + \frac{20}{3}$

37.  $f(x) = \left(\frac{1}{2}x + 6\right)^4 - 3$

$y^{-1} = 2\sqrt[4]{x+3} - 12$

38.  $f(x) = 5\sqrt[3]{x-7} + 10$

$y^{-1} = \left(\frac{1}{5}(x-10)\right)^3 + 7$

39.  $f(x) = \frac{-3}{x+7} + 4$

$y^{-1} = \frac{-3}{x-4} - 7$

40.  $f(x) = -4(x+11)^{\frac{1}{2}} + 4$

$y^{-1} = \left(-\frac{1}{4}(x-4)\right)^2 - 1$

Are  $f(x)$  and  $g(x)$  inverse functions? Verify algebraically. (Be able to show every little step!)

41.  $f(x) = \frac{1}{3}x + 6$ ;  $g(x) = 3x - 18$

42.  $f(x) = \sqrt{\frac{x-4}{3}}$ ;  $g(x) = 27x^2 + 4$

43.  $f(x) = \frac{1}{5}x^3$ ;  $g(x) = \sqrt[3]{5x}$

see original review

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