Algebra 2H
7.1-7.4 Practice

Name:_____

Simplify each expression **completely**. *No negative exponents. No radicals in the denominator.*

1. $\dfrac{\sqrt[4]{81}}{\sqrt[4]{8}}$

$\dfrac{3\sqrt[4]{2}}{2}$

2. $12\sqrt[3]{2z^5} - z\sqrt[3]{54z^2}$

$9z\sqrt[3]{2z^2}$

3. $\left(\dfrac{42^{\frac{1}{3}}}{6^{\frac{1}{3}}}\right)^2$

$7^{2/3} = \left(\sqrt[3]{7}\right)^2$

4. $\sqrt[5]{486a^8b^{14}c^5}$

$3ab^2c\sqrt[5]{2a^3b^4}$

5. $\left(\dfrac{2x^3y^{\frac{2}{3}}}{x^{\frac{5}{3}}y^{\frac{3}{5}}z}\right)^3$

$\dfrac{8x^4y^{1/5}}{z^3}$

6. $\sqrt[3]{\dfrac{81x^2y^3}{8xy^4z}}$

$\dfrac{3\sqrt[3]{3xy^2z^2}}{2yz}$

7. $\sqrt[4]{\dfrac{x^7}{y^8}}$

$\dfrac{x\sqrt[4]{x^3}}{y^2}$

8. $3(x^{\frac{1}{2}}y^3)^2 - (x^3y^{18})^{\frac{1}{3}}$

$2xy^6$

9. $\sqrt[4]{(3x^3)^3 \cdot (3x^2)^5}$

$9x^4\sqrt[4]{x^3}$

For 10-12, let $f(x) = x^2 + 1$, $g(x) = -3x^{1/3}$, and $h(x) = x^{\frac{1}{2}}$. Perform the indicated operation and give the domain. Simplify your answer completely.

10. $\dfrac{g(x)}{h(x)}$

11. $f(g(x))$

12. $f(x) \cdot h(x)$

$$\dfrac{-\dfrac{3x^{1/6}}{x}}{\quad} \qquad \dfrac{\dfrac{9x^{1/3}}{x}+1}{\quad} \qquad \dfrac{x^{3/2}+x^{1/2}}{\quad}$$

Domain: $\underline{x > 0}$

Domain: $\underline{\mathbb{R}, x \neq 0}$

Domain: $\underline{x \geq 0}$

For 13-14, find the equation for the inverse of each function.
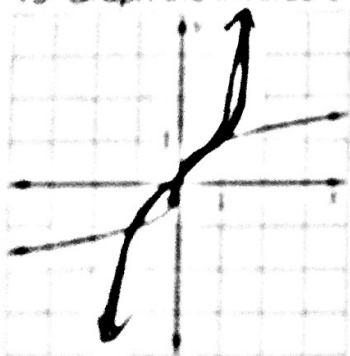
13. $f(x) = \dfrac{1}{5}x + 3$

14. $f(x) = 4x^3$

$$f^{-1}(x) = 5x - 15$$

$$f^{-1}(x) = \dfrac{\sqrt[3]{x}}{2}$$

15. Graph the inverse of the given function. State whether the inverse is a function.

16. A function $f(x)$ contains the points $(-2,3), (0,-1), (2,-2), (4,6)$. Give the points known to be in the inverse of $f(x)$: $f^{-1}(x) = (3,-2)(-1,0)(-2,2)(6,4)$

a) Find $f(0) = -1$

b) Find $f^{-1}(3), f^{-1}(-2)$

$-2, 2$

c) Find $f^{-1}(f(-2)) = -2$

d) Find $f(f^{-1}(-2)) = -2$

17. Given the functions $f(x) = -4 + 0.5(x-3)^3$ and $g(x) = 3 + \sqrt[3]{(2x+4)}$:

a) Find $f(3)$ and $g(-4)$.   What does this imply?

$$= -4 \qquad = 3 + \sqrt[3]{-4}$$

not inverses

b) Find $f(6)$ and $g(9.5)$.   What does this imply?

$$= 9.5 \qquad = 3 + \sqrt[3]{15}$$

not inverses.

c) Over what domain are f and g inverse functions? You can use your calculator to graph them if you'd like.

18. Given $g(t) = 5 + 2t$ find each value:

a) g(12) $= 29$

b) $g^{-1}(-9) = -7$

c) $g^{-1}(21) = 8$

10. Given $f(x) = 4 + (x-2)^{\frac{3}{5}}$:

a) Solve for x when f(x) = 31.

$$x = 245$$

b) Find $f^{-1}(x)$. $= (x-4)^{5/3} + 2$

c) Algebraically, what is true of inverse functions?

$$f(g(x)) = x \quad \underline{AND} \quad g(f(x)) = x$$