ADV ALGEBRA 2 — Extra Practice QUIZ Review 6.1-6.3 — Name: Key

PART 1 - No Calculator

Find the indicated real nth root(s) of a. $\sqrt[n]{a}$

1. n = 3, a = -27

$\sqrt[3]{-27} = \boxed{-3}$

2. n = 2, a = 1/25

$\sqrt{\frac{1}{25}} = \boxed{\pm\frac{1}{5}}$

Evaluate the expression.

3. $81^{3/4}$

$\left(\sqrt[4]{81}\right)^3 = 3^3 = \boxed{27}$

4. $36^{-1/2}$

$\frac{1}{36^{1/2}} = \frac{1}{\sqrt{36}} = \boxed{\frac{1}{6}}$

5. $(-125)^{2/3}$

$\left(\sqrt[3]{-125}\right)^2 = (-5)^2 = \boxed{25}$

Simplify the expression.

6. $\left(\sqrt[4]{3}\cdot 3^{3/4}\right)^3$

$(\sqrt[4]{3})^3 \cdot (3^{3/4})^3$

$3^{3/4}\cdot 3^{9/4} = 3^{12/4}$

$3^3 = \boxed{27}$

7. $\frac{32^{2/3}}{4^{2/3}} = 8^{2/3}$

$\left(\sqrt[3]{8}\right)^2 = 2^2 = \boxed{4}$

8. $4\sqrt[3]{16} - \sqrt[3]{250}$

$4\sqrt[3]{8}\cdot\sqrt[3]{2} - \sqrt[3]{125}\cdot\sqrt[3]{2}$

$4\cdot 2\cdot\sqrt[3]{2} - 5\sqrt[3]{2}$

$8\sqrt[3]{2} - 5\sqrt[3]{2} = \boxed{3\sqrt[3]{2}}$

9. $\sqrt[4]{162x^8y^{10}z^5}$

$\sqrt[4]{81}\cdot\sqrt[4]{2}\cdot x^2\cdot y^2\sqrt[4]{y^2}\cdot z\sqrt[4]{z}$

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

10. $\sqrt[5]{\frac{a^8b^{10}}{c^2}} = \frac{\sqrt[5]{a^8b^{10}}}{\sqrt[5]{c^2}}\cdot\frac{\sqrt[5]{c^3}}{\sqrt[5]{c^3}}$

$\frac{\sqrt[5]{a^8b^{10}c^3}}{\sqrt[5]{c^5}} = \boxed{\frac{ab^2\sqrt[5]{a^3c^3}}{c}}$

11. $y^2\sqrt[4]{48x^9} - 7x\sqrt[4]{3x^5y^8}$

$y^2\cdot\sqrt[4]{16}\cdot\sqrt[4]{3}\cdot\sqrt[4]{x^8}\cdot x - 7x\sqrt[4]{3}\cdot\sqrt[4]{x^5}\cdot\sqrt[4]{y^8}$

$2y^2x^2\sqrt[4]{3x} - 7x^2y^2\sqrt[4]{3x}$

$\boxed{-5y^2x^2\sqrt[4]{3x}}$

Find the equation for the inverse relation *(write your answer in function notation)*

12. $y = -5x + 12$

$x = -5y + 12$

$x - 12 = -5y$

$y = -\frac{1}{5}x + \frac{12}{5}$

$\boxed{f^{-1}(x) = -\frac{1}{5}x + \frac{12}{5}}$

13. $y = 125x^3$

$x = 125y^3$

$\sqrt[3]{\frac{x}{125}} = \sqrt[3]{y^3}$

$y = \frac{\sqrt[3]{x}}{5}$

$\boxed{f^{-1}(x) = \frac{\sqrt[3]{x}}{5} \text{ or } = \frac{x^{1/3}}{5}}$

PART 2 - Calculator allowed

means use the calculator to find roots if needed

Solve the equation. Show work and round decimals to 2 places when necessary.

1. $(x+2)^3 - 1 = -19$

$+1 \quad +1$

$\sqrt[3]{(x+2)^3} = \sqrt[3]{-18}$

$x+2 = -2.62$

$x = -4.62$

2. $3x^4 - 20 = -2$

$+20 \quad +20$

$3x^4 = 18$

$\sqrt[4]{x^4} = \sqrt[4]{6}$

$x = 1.57$

Let $f(x) = 5x^{3/2}$ and $g(x) = -3x^{3/2}$. Perform the indicated operation and state the domain.

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

$5x^{3/2} + -3x^{3/2}$

$2x^{3/2}$ Domain: $\mathbb{R}$

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

$-3x^{3/2} \cdot 5x^{3/2}$

$-15x^{6/2}$

$-15x^3$ D: $\mathbb{R}$

5. $\frac{f(x)}{g(x)} = \frac{5x^{3/2}}{-3x^{3/2}}$

Can't have 0 in original functions

$-\frac{5}{3}$ D: $\mathbb{R} \neq 0$

Let $f(x) = 2x^2 - 1$ and $g(x) = x + 2$. Find the following.

6. $g(f(0))$

$f(0) = 2(0)^2 - 1 = -1$

$g(-1) = -1 + 2 = 1$

$g(f(0)) = 1$

7. $f(g(x))$

$f(g(x)) = 2(x+2)^2 - 1$

$= 2(x^2 + 4x + 4) - 1$

$f(g(x)) = 2x^2 + 8x + 7$

8. $g(f(x))$

$g(f(x)) = (2x^2 - 1) + 2$

$g(f(x)) = 2x^2 + 1$

Find the following compositions and their domain.

9. **Let $f(x) = 3x^{-1/2}$ and $g(x) = x + 5$**

9. $f(g(x)) = 3(x+5)^{-1/2}$

$\frac{3}{\sqrt{(x+5)}} \cdot \frac{\sqrt{x+5}}{\sqrt{x+5}} = \frac{3\sqrt{x+5}}{x+5}$

D: $\mathbb{R} > -5$

10. **Let $f(x) = 3x^{-2}$**

10. $f(f(x)) = 3(3x^{-2})^{-2}$

$3(3^{-2}x^4) = \frac{3x^4}{9} = \frac{x^4}{3}$

$3 \cdot 3^{-2} \cdot x^4$

D: $\mathbb{R}$

11. The cost in dollars of g gallons of gasoline can be modeled by $C(g) = 3.4g$. The amount of gasoline used by a Ford F150 can be modeled by $g(d) = 0.015d^{1.3}$ where d is the distance in miles. Find ① $C(g(d))$ and evaluate ② $C(g(500))$. Explain what ③ $C(g(500))$ represents.

① $C(g(d)) = 3.4(.015d^{1.3}) = .051d^{1.3}$

② $C(g(500)) = .051(500)^{1.3} = \$164.52$

③ Cost of gas $164.52 based on amt. of gas used for 500 miles