Algebra 2 Chapter 6 Practice Test Name KEY

1. Evaluate $\sqrt[3]{-123}$ using a calculator. Round the result to two decimal places if appropriate.

-4.97

Simplify each expression. Assume all variables are positive.

2. $\dfrac{64^{-\frac{2}{5}}}{64^{-\frac{4}{5}}} = 64^{-\frac{2}{5}-\left(-\frac{4}{5}\right)}$

$= 64^{-\frac{2}{5}+\frac{4}{5}} = \boxed{64^{\frac{2}{5}}}$ ok

$= \sqrt[5]{64^2} = \sqrt[5]{2^6 \cdot 2^6} = \sqrt[5]{2^{12}} = 2 \cdot 2\sqrt[5]{2^2}$

$= \boxed{4\sqrt[5]{4}}$ Simplified

3. $\sqrt[5]{x^{10}} = \boxed{x^2}$

4. $x^{\frac{1}{3}} \cdot x^{\frac{1}{3}} \cdot x^{\frac{1}{3}}$

$= x^{\frac{1}{3}+\frac{1}{3}+\frac{1}{3}}$

$= x^{\frac{3}{3}}$

$= x^1 = \boxed{x}$

5. $(x^8)^{\frac{1}{4}} = x^{8\left(\frac{1}{4}\right)}$

$= \boxed{x^2}$

Let $f(x) = x + 7$ and $g(x) = -4x^2$. Perform the indicated operation and simplify.

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

$x + 7 + (-4x^2)$

$\boxed{-4x^2 + x + 7}$

7. $\dfrac{f(x)}{g(x)}$

$\boxed{\dfrac{x+7}{-4x^2}}$

8. $g(x) \cdot g(x)$

$(-4x^2)(-4x^2)$

$\boxed{16x^4}$

9. $g(f(6))$

$f(6) = 6 + 7 = 13$

$g(13) = -4(13)^2$

$= -4(169)$

$= \boxed{-676}$

10. $g(f(x))$

$-4(x+7)^2$

$-4(x^2 + 14x + 49)$

$\boxed{-4x^2 - 56x - 196}$

Find the inverse of the function.

11. $f(x) = -4x^7$

$y = -4x^7$

$x = -4y^7$

$\dfrac{x}{-4} = y^7$

$\Rightarrow \boxed{\sqrt[7]{\dfrac{x}{-4}} = y}$

12. $f(x) = \dfrac{4x+5}{3}$

$y = \dfrac{4x+5}{3}$

$x = \dfrac{4y+5}{3}$

$\Rightarrow 3x = 4y + 5$

$3x - 5 = 4y$

$\boxed{\dfrac{3x-5}{4} = y}$

13. Verify that f and g are inverse functions.

$f(x) = \sqrt[3]{\frac{x}{8}}$, $g(x) = 8x^3$

$f(g(x)) = \sqrt[3]{\frac{8x^3}{8}} = \sqrt[3]{x^3} = x$ ✓

$g(f(x)) = 8\left(\sqrt[3]{\frac{x}{8}}\right)^3 = 8\left(\frac{x}{8}\right) = x$ ✓

14. A student solved $\sqrt{x+2} + 1 = \sqrt{3-x}$ and got x = 2 and x = -1. Explain why one solution is extraneous.

$x = 2$:

$\sqrt{2+2} + 1 = \sqrt{3-2}$

$\sqrt{4} + 1 = \sqrt{1}$

$2 + 1 = 1$

$3 \neq 1$

2 is extraneous

Solve the equation. Be sure to check for extraneous solutions.

15. $4 = \sqrt[3]{2x+1}$

$(4)^3 = \left(\sqrt[3]{2x+1}\right)^3$

$64 = 2x + 1$

$63 = 2x$

$\frac{63}{2} = x$

Check:

$4 = \sqrt[3]{2\left(\frac{63}{2}\right)+1}$

$4 = \sqrt[3]{64}$

$4 = 4$ ✓

16. $(x+8)^{\frac{1}{5}} + 1 = 3$

$(x+8)^{\frac{1}{5}} = 2$

$\left[(x+8)^{\frac{1}{5}}\right]^5 = [2]^5$

$x + 8 = 32$

$x = 24$

Check:

$(24+8)^{\frac{1}{5}} + 1 = 3$

$32^{\frac{1}{5}} + 1 = 3$

$2 + 1 = 3$

$3 = 3$ ✓

17. $(9x+7)^4 = 16$

$\left[(9x+7)^4\right]^{\frac{1}{4}} = 16^{\frac{1}{4}}$

$9x + 7 = \pm 2$

$9x + 7 = 2$ or $9x + 7 = -2$

$9x = -5$ or $9x = -9$

$x = -\frac{5}{9}$ or $x = -1$

Check:

$\left(9\left(-\frac{5}{9}\right)+7\right)^4 = 16$

$(-5+7)^4 = 16$

$2^4 = 16$

$16 = 16$ ✓

Check

$(9(-1)+7)^4 = 16$

$(-9+7)^4$

$(-2)^4 = 16$

$16 = 16$ ✓

19. According to Kepler's third law of planetary motion, the function $p = 0.199a^{\frac{3}{2}}$ relates a planet's orbital period p (in days) to the length a (in millions of kilometers) of the orbit's minor axis. The orbital period of Mars is about 1.88 years. What is the length of the orbit's minor axis?

$1.88 = 0.199a^{\frac{3}{2}}$

$\frac{1.88}{0.199} = \frac{0.199a^{\frac{3}{2}}}{0.199}$

$9.45 = a^{\frac{3}{2}}$

$(9.45)^{\frac{2}{3}} = \left[a^{\frac{3}{2}}\right]^{\frac{2}{3}}$

$4.47 = a$

4.47 million km

Name KEY

Ch. 6 Practice Test - No calculator

1. Evaluate: $\sqrt[3]{-64}$ -4

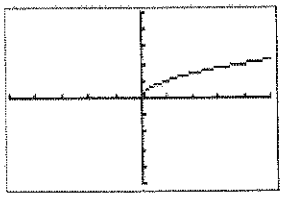
2. Evaluate: $\sqrt[3]{125}$ 5

3. Evaluate: $(-27)^{\frac{2}{3}}$ $(\sqrt[3]{-27})^2 = (-3)^2 = 9$

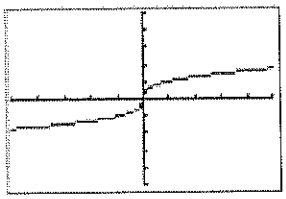
For each function, complete the following.

a. Identify the basic shape. (Choose from A, B, C, or D below.)
b. State whether the graph is steeper, flatter, or the same as the parent graph.
c. Identify any horizontal shift. Specify left or right. If none, write "none."
d. Identify any vertical shift. Specify up or down. If none, write "none."
e. State the domain and range.

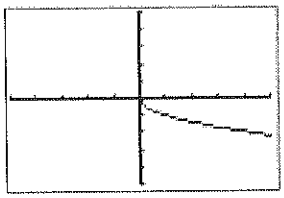
A



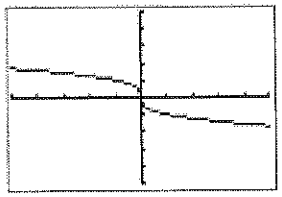
B



C



D



4. $y = \frac{3}{4}\sqrt[3]{x-7} + 1$

a. Basic shape B

b. (Flatter) Steeper Same (circle one)

c. Horizontal Shift 7 right

d. Vertical Shift 1 up

e. Domain All real #'s

Range All real #'s

5. $y = -\frac{1}{2}\sqrt[3]{x}$

a. Basic shape D

b. (Flatter) Steeper Same (circle one)

c. Horizontal Shift none

d. Vertical Shift none

e. Domain All real #'s

Range All real #'s

6. $y = \frac{3}{2}\sqrt{x+5} - 9$

a. Basic shape A

b. Flatter (Steeper) Same (circle one)

c. Horizontal Shift 5 left

d. Vertical Shift 9 down

e. Domain $x \geq -5$

Range $y \geq -9$

7. Rewrite $8^{\frac{3}{7}}$ using radical notation.

$\sqrt[7]{8^3}$

8. Rewrite $\sqrt{15^7}$ using rational exponent notation.

$15^{\frac{7}{2}}$