Chapter 6 Practice Test

Name KEY

1. Evaluate $\sqrt[3]{-2358}$ using a calculator. Round the result to two decimal places if appropriate.

-13.31

Simplify the expression. Assume all variables are positive.

2. $\dfrac{3^{2/3}}{3^{-1/3}}$

$3^{\frac{2}{3}-\,-\frac{1}{3}}$

$3^{\frac{2}{3}+\frac{1}{3}}$

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

3. $8\sqrt{8} - 4\sqrt{18}$

$8\sqrt{4}\sqrt{2}-4\sqrt{9}\sqrt{2}$

$8\cdot 2\sqrt{2}-4\cdot 3\sqrt{2}$

$16\sqrt{2}-12\sqrt{2}$

$4\sqrt{2}$

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

$x^{\frac{1}{2}+\frac{3}{4}}$

$x^{\frac{2}{4}+\frac{3}{4}}$

$x^{\frac{5}{4}}$ OR

$x\sqrt[4]{x}$

5. $x^{15}\cdot x^{20}$

x^{15+20}

x^{35}

Let $f(x) = 2x^2 - 5$ and $g(x) = 3x^2$. Perform the indicated operation.

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

$2x^2-5+3x^2$

$5x^2-5$

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

$\dfrac{2x^2-5}{3x^2}$

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

$3x^2\cdot 3x^2$

$9x^4$

9. $g(f(2))$

$f(2)=2(2)^2-5$

$=2(4)-5$

$=8-5$

$=3$

$g(3)=3(3)^2$

$=3\cdot 9$

$=27$

10. $g(f(x))$

$3(\quad)^2$

$3(2x^2-5)^2$

$3(2x^2-5)(2x^2-5)$

$3(4x^4-20x^2+25)$

$12x^4-60x^2+75$

11. $f(g(x))$

$2(\quad)^2-5$

$2(3x^2)^2-5$

$2(9x^4)-5$

$18x^4-5$

Find the inverse of the function.

12. $f(x) = \frac{1}{16}x^4$, $x \geq 0$

$y = \frac{1}{16}x^4$

$x = \frac{1}{16}y^4$

$16x = y^4$

$\sqrt[4]{16x} = y$

13. $f(x) = \frac{2x+5}{3}$

$y = \frac{2x+5}{3}$

$x = \frac{2y+5}{3}$

$3x = 2y+5$

$3x-5 = 2y$

$\frac{3x-5}{2} = y$

Verify that f and g are inverse functions.

14. $f(x) = 2x + 5$, $g(x) = \frac{x-5}{2}$

$f(g(x)) = 2\left(\frac{x-5}{2}\right) + 5$

$= x - 5 + 5 = x$

$g(f(x)) = \frac{(2x+5)-5}{2}$

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

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

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

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

Solve the equation.

16. $4 = \sqrt[3]{2x-8}$

$4^3 = (\sqrt[3]{2x-8})^3$

$64 = 2x-8$

$72 = 2x$

$36 = x$

check: $\sqrt[3]{2(36)-8}$

$= \sqrt[3]{64}$

$= 4$ ✓

17. $(x^2 - 1)^{2/3} + 2 = 6$

$(x^2-1)^{\frac{2}{3}} = 4$

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

$x^2 - 1 = 8$

$x^2 = 9$

$x = \pm 3$

check: $(3^2-1)^{\frac{2}{3}} + 2 = 6$

$8^{\frac{2}{3}} + 2 = 6$

$4 + 2 = 6$ ✓

$x = 3$

$((-3)^2-1)^{\frac{2}{3}} + 2 = 6$

$8^{\frac{2}{3}} + 2 = 6$

$4 + 2 = 6$

$6 = 6$ ✓

$x = -3$

18. $x + 2 = \sqrt{28 - x}$

$(x+2)^2 = 28 - x$

$x^2 + 4x + 4 = 28 - x$

$x^2 + 5x - 24 = 0$

$(x+8)(x-3) = 0$

$x = -8, 3$

extraneous

check:

$-8 + 2 = \sqrt{28 - -8}$

$-6 = \sqrt{36}$

No. (not a principal square root)

$3 + 2 = \sqrt{28-3}$

$5 = 5$ ✓

$x = 3$

19. $\sqrt{3x+5} = \sqrt{4x-2}$

$3x + 5 = 4x - 2$

$7 = x$

check:

$\sqrt{21+5} = \sqrt{28-2}$

$\sqrt{26} = \sqrt{26}$ ✓

$x = 7$

Name KEY

Ch. 6 Practice Test - No calculator

1. $\sqrt[3]{-8}$

-2

2. $\sqrt[5]{32}$

2

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

For each function, complete the following.

a. Identify the basic shape. (Choose from A, B, C, or D below.)

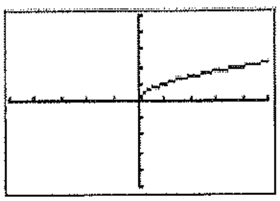
b. State whether the graph is steeper, flatter, or the same as the parent graph.

c. Identify any horizontal shift. Specify left or right. If none, write "none."

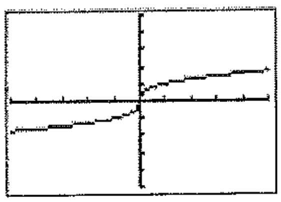
d. Identify any vertical shift. Specify up or down. If none, write "none."

e. State the domain and range.

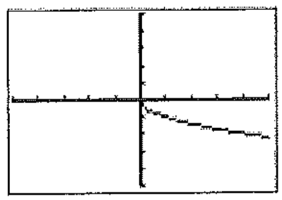
A



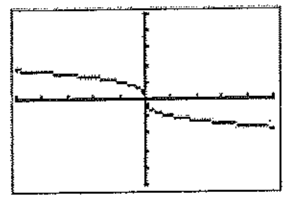
B



C



D



4. $y = 2\sqrt{x}$

a. Basic shape A

b. Flatter **Steeper** Same (circle one)

c. Horizontal Shift none

d. Vertical Shift none

e. Domain $x \geq 0$

Range $y \geq 0$

5. $y = 2\sqrt{x+2} - 2$

a. Basic shape A

b. Flatter **Steeper** Same (circle one)

c. Horizontal Shift left 2

d. Vertical Shift down 2

e. Domain $x \geq -2$

Range $y \geq -2$

6. $y = -3\sqrt[3]{x}$

a. Basic shape D

b. Flatter **Steeper** Same (circle one)

c. Horizontal Shift none

d. Vertical Shift none

e. Domain all Real

Range all Real

7. $y = \frac{1}{3}\sqrt[3]{x-7} + 6$

a. Basic shape B

b. **Flatter** Steeper Same (circle one)

c. Horizontal Shift right 7

d. Vertical Shift up 6

e. Domain All Real

Range All Real