Name **Key** Date _____ Pd ___

Chapter 5 Test Review CYU

CONCEPTS	BASIC	INTERMEDIATE	ADVANCED
Evaluating expressions	1, 2	3	
Solving equations with exponents	4, 5	6	
Applying properties of exponents	7, 8		
Rationalizing denominators with conjugates		9	
Performing operations with radicals	10	11	12
Simplifying radicals	14	15	16
Describing radical transformations	18	17	
Graphing radical functions	18	17	
Solving radical equations	19	21	20
Solving radical inequalities	22 - 24		
Checking for extraneous solutions	19 – 24		
Modeling with mathematics	25		34
Performing function operations		26	27
Inverse functions	28, 29	30, 31	32, 33

5.1 nth Roots & Rational Exponents

Evaluate the expression without using a calculator.

1. $8^{\frac{7}{3}}$

128

2. $9^{\frac{5}{2}}$

243

3. $(-27)^{-\frac{2}{3}}$

$\frac{1}{9}$

Find the real solution(s) of the equation. Round your answer to the thousandths place when appropriate.

4. $x^5 + 17 = 35$

$x \approx 1.783$

5. $7x^3 = 189$

$x = 3$

6. $(x + 8)^4 = 16$

$x = -6, -10$

5.2 Properties of Rational Exponents & Radicals

Simplify the expression completely.

7. $\left(\frac{6^{\frac{1}{5}}}{6^{\frac{2}{5}}}\right)^3$

$\dfrac{1}{6^{\frac{3}{5}}}$

8. $\sqrt[4]{32} \cdot \sqrt[4]{8}$

4

9. $\dfrac{1}{2 - \sqrt[2]{8}}$

$\dfrac{1 + \sqrt{2}}{-2}$

10. $4\sqrt[5]{8} + 3\sqrt[5]{8}$

$7\sqrt[5]{8}$

11. $2\sqrt{48} - \sqrt{3}$

$7\sqrt{3}$

12. $\left(5^{\frac{2}{3}} \cdot 2^{\frac{3}{2}}\right)^{\frac{1}{2}}$

$5^{\frac{1}{3}} \cdot 2^{\frac{3}{4}}$

Simplify the expression. Restrict the domain when necessary.
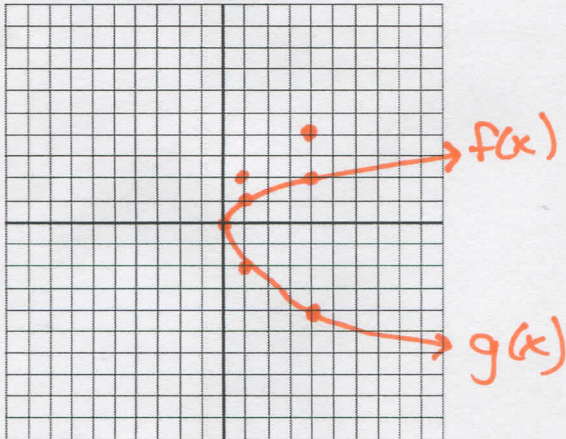
14. $\sqrt[3]{125w^9}$

$5w^3$

15. $\dfrac{2^{\frac{1}{4}}y^{\frac{5}{4}}}{6y}$

$\dfrac{(2y)^{\frac{1}{4}}}{6}$ or $\dfrac{\sqrt[4]{2}\,y^{\frac{1}{4}}}{6}$

16. $\sqrt{10a^5} - a^2\sqrt{40a}$

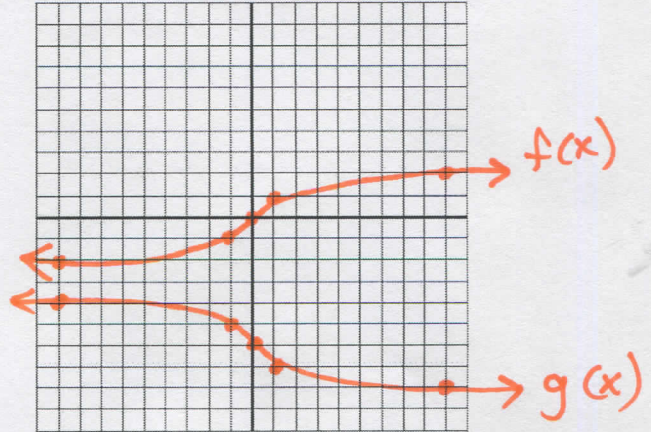$-a^2\sqrt{10a}$

5.3 Graphing Radical Functions

Describe the transformation of f represented by g. Then graph each function.

17. $f(x) = \sqrt{x},\ g(x) = -2\sqrt{x}$

$R_x\ ;\ VS\ 2$

18. $f(x) = \sqrt[3]{x},\ g(x) = \sqrt[3]{-x} - 6$

$R_y\ ;\ \downarrow 6u$

5.4 Solving Radical Equations & Inequalities

Solve the equation. Check your solution for extraneous solutions. Restrict the domain when necessary.

19. $4\sqrt[3]{2x+1} = 20$

$x = 62$

20. $\sqrt{4x-4} = \sqrt{6x-1} + 1$

$x = 1 \pm 2i$

21. $(-3x)^{\frac{2}{3}} = 36$

$x = -72$

Solve the inequality. Remember when the sign flips.

22. $-5\sqrt{x} - 3 > 17$

$0 \le x < 16$

23. $2\sqrt{x+7} \le 32$

$-7 \le x \le 249$

24. $-\sqrt[3]{x-2} \ge 4$

$x \le -62$

25. In a wave pool, the wave speeds in meters per second can be modeled by $s(d) = \sqrt{9.8d}$, where d is the depth in meters of the water in the wave pool. Estimate the depth of the water when the wave speed is 200 meters per second.

$\approx 4{,}081 \text{ meters deep}$

5.5 Performing Function Operations

Perform the given operations, state the domain, and then evaluate given an x value.

26. Let $f(x) = 5\sqrt{2-x}$ and $g(x) = -2\sqrt[3]{2-x}$. Find $(fg)(x)$ and $\left(\frac{f}{g}\right)(x)$. Domain. Evaluate when $x = 2$.

$(fg)(x) = -10(2-x)^{\frac{5}{6}}$

$(fg)(2) = 0$

$D: (-\infty, 2]$

$\left(\frac{f}{g}\right)(x) = -\frac{5}{2}(2-x)^{\frac{1}{6}}$

$\left(\frac{f}{g}\right)(2) = \text{undefined}$

$D: (-\infty, 2)$

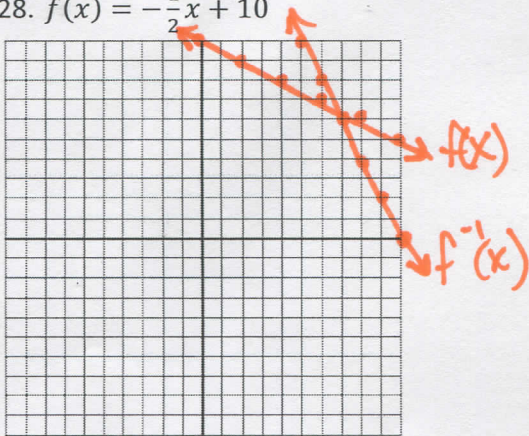27. Let $f(x) = 3x^2 - 1$ and $g(x) = x - 5$. Find $(f+g)(x)$ and $(f-g)(x)$. Domain. Evaluate for $x = -5$.

$(f+g)(x) = 3x^2 + x - 6$

$D: (-\infty, \infty)$

$(f+g)(-5) = 64$

$(f-g)(x) = 3x^2 - x + 4$
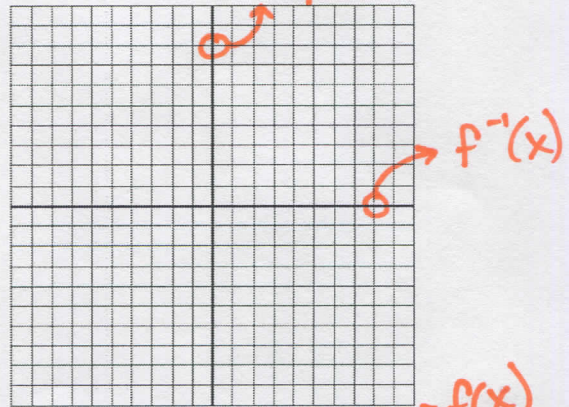
$D: (-\infty, \infty)$

$(f-g)(-5) = 84$

5.6 Inverse Functions

Find the inverse of the function. Then graph the function and its inverse.
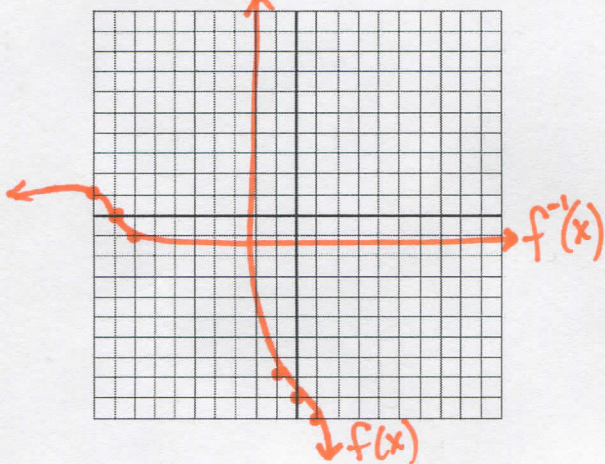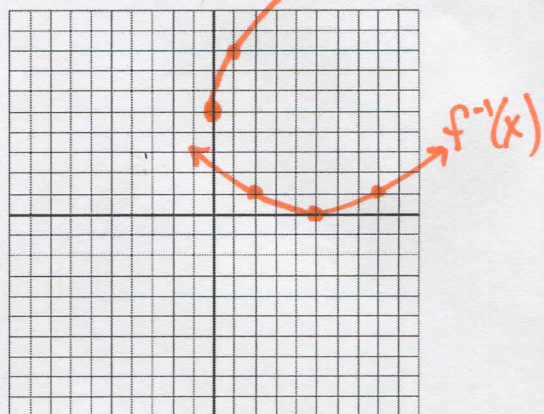
28. $f(x) = -\frac{1}{2}x + 10$

29. $f(x) = x^2 + 8, (0, \infty)$

30. $f(x) = -x^3 - 9$

31. $f(x) = 3\sqrt{x} + 5$

Determine whether the functions are inverse functions.

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

NO

33. $f(x) = -2x + 6, g(x) = -\frac{1}{2}x + 3$

YES

34. On a certain day, the function that gives U. S. dollars in terms of British pounds is $d = 1.587p$, where d represents U. S. dollars and p represents British pounds. Find the inverse function. Then find the number of British pounds equivalent to 100 U.S. dollars.

≈ 63 pounds

CYU Reflection: _How far can you go: basic, intermediate, or advanced?_
Rate your mastery level!
How confident are you with the skills this CYU covered? Circle the score you would give yourself

1 2	3 4 5	6 7	8
Basic	Intermediate	Advanced	Solved ALL!