NAME Key DATE _____ PERIOD _____

Chapter 6 Practice Test

SCORE _____

Write the letter for the correct answer in the blank at the right of each question.

For Questions 1 and 2, use $f(x) = x + 5$ and $g(x) = 2x^3$.

1. Find $(f \cdot g)(x)$. $2x^3(x+5)$

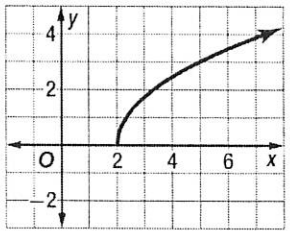
1. $2x^4+1$

2. If $f(x) = x^2$ and $g(x) = 3x - 1$ find $[f \circ g](x)$.

$f(g(x))$
$= (3x-1)^2$

2. $9x^2-6x+1$

3. State the domain and range of the function graphed.



3. D: $x \geq 2$
R: $y \geq 0$

4. Find the inverse of $g(x) = -3x + 4$.

$y = -3x + 4$
$x = -3y + 4$
$\frac{x-4}{-3}$ OR $\frac{4-x}{3} = y$

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

5. Determine which pair of functions are *not* inverse functions. $f(g(x)) = g(f(x)) = x$

A	B	C	D
$g(x) = 2x + 9$	$g(x) = x - 1$	$g(x) = 3x - 6$	$g(x) = 3x + 4$
$h(x) = \frac{1}{2}x - 9$	$h(x) = x + 1$	$h(x) = \frac{1}{3}x + 2$	$h(x) = \frac{x-4}{3}$

$\frac{1}{2}(2x+9) - 9 = x + 9/2 - 9 \neq x$

5. A

6. What is the domain of $y \leq \sqrt{3x + 8}$?

$3x + 8 \geq 0 \rightarrow 3x \geq -8$
$\frac{3x}{3} \geq \frac{-8}{3}$

6. D: $x \geq -8/3$

7. Simplify $\sqrt{49x^6y^4}$.

7. $7x^3y^2$

8. Use a calculator to approximate $\sqrt[5]{168}$ to three decimal places.

$\sqrt[5]{168}$ $(168)^{1/5}$

8. ≈ 2.79

9. Simplify $\sqrt[3]{24a^6b^5}$

$2 \cdot 2 \cdot 2 \cdot 3$ $a^2 \cdot a^2 \cdot a^2$ $b \cdot b \cdot b \cdot b \cdot b$
$= 2a^2b\sqrt[3]{3b^2}$

9. $2a^2b\sqrt[3]{3b^2}$

10. Simplify $5\sqrt{72} + \sqrt{75} - \sqrt{288}$.

$36 \cdot 2$ $25 \cdot 3$ $2 \cdot 144$
$6 \cdot 6$ $5 \cdot 5$ $2 \cdot 12 \cdot 12$

$30\sqrt{2} + 5\sqrt{3} - 12\sqrt{2}$

10. $18\sqrt{2} + 5\sqrt{3}$

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Chapter 6 Practice Test *(continued)*

11. Simplify $\frac{3}{3+\sqrt{5}}$. $\frac{3}{3+\sqrt{5}} \cdot \frac{(3-\sqrt{5})}{(3-\sqrt{5})} = \frac{9-3\sqrt{5}}{9-5} = \frac{9-3\sqrt{5}}{4}$

11. $\frac{9-3\sqrt{5}}{4}$

12. Write the radical $\sqrt[5]{32m^3}$ using rational exponents. $(32m^3)^{1/5}$

12. $(32)^{1/5} m^{3/5}$

13. Simplify the expression $\frac{x^{\frac{2}{5}}}{x^{\frac{1}{2}}}$. $x^{2/5 - 1/2}$ $x^{4/10 - 5/10} = x^{-1/10}$

13. $x^{-1/10}$

14. Solve $\sqrt[3]{3m+1} = (4.)^3$ $3m+1 = 64$ $\frac{3m}{3} = \frac{63}{3}$ $m = 21$

14. $m = 21$

15. Solve $2 + \sqrt{5x-1} > 5$. $5x - 1 \geq 0$ $5x \geq 1$ $x \geq 1/5$ $\sqrt{5x-1} > 3$ $5x - 1 > 9$ $+1 \quad +1$ $\frac{5x}{5} > \frac{10}{5}$ $x > 2$

15. $x > 2$

16. The velocity of v in feet per second of a roller coaster at the bottom of a hill is related to the vertical drop h in feet and the velocity v_0 in feet per second of the coaster at the top of the hill by the formula $v_0 = \sqrt{v^2 - 64h}$. What velocity must a coaster have at the top of a 150-foot hill to achieve a velocity of 100 feet per second? $\sqrt{100^2 - 64(150)} = \sqrt{400}$

16. $v_0 = 20$

17. TREES The diameter of a tree d (in inches) is related to its basal area BA (in square feet) by the formula $d = \sqrt{\frac{576(BA)}{\pi}}$. If the basal area of a tree is 12.4 square feet, what is the diameter of the tree? Use a calculator to approximate your answer to three decimal places. Use 3.14 for π. $d = \sqrt{\frac{576(12.4)}{\pi}}$

17. ≈ 47.69

18. Find the area of a circle whose radius is $3x^{\frac{4}{5}}y^3$. Use 3.14 for π. $A = \pi(3x^{4/5}y^3)^2$ $= \pi \cdot 9x^{8/5}y^6$

18. $9\pi x^{8/5} y^6$

19. If x is a positive number, then $\sqrt[5]{x} \div x^{\frac{1}{5}} = ?$ $\frac{x^{1/5}}{x^{1/5}}$

19. 1

20. The radius r of a sphere with volume V is given by $r = \left(\frac{3V}{4\pi}\right)^{\frac{1}{3}}$. Find the radius of a ball that holds 66 cubic centimeters of air. $\left(\frac{3(66)}{4\pi}\right)^{1/3}$

20. ≈ 2.51

Bonus If $g(x) = 2x + 1$, find $g[g(x)]$.

B: 11