

Chapter 6 Test

Form K

Do you know HOW?

Simplify each radical expression. Use absolute value symbols when needed.

1. $\sqrt{49x^2y^{10}}$
 $7|xy^5|$

2. $\sqrt[3]{-64y^9}$
 $-4y^3$

3. $\sqrt[5]{243x^{15}}$
 $3x^3$

Multiply and simplify.

4. $\sqrt[3]{15} \times \sqrt[3]{18}$
 $3\sqrt[3]{10}$

5. $\sqrt{7x^3} \cdot \sqrt{14x}$
 $7x^2\sqrt{2}$

6. $3\sqrt[4]{4x^3} \cdot \sqrt[4]{8xy^5}$
 $6xy\sqrt[4]{2y}$

Rationalize each denominator. Simplify your answer.

7. $\frac{1}{\sqrt{3}}$ $\frac{\sqrt{3}}{3}$

8. $\frac{\sqrt{x}}{\sqrt{5}}$ $\frac{\sqrt{5x}}{5}$

9. $\frac{\sqrt[3]{4}}{\sqrt[3]{2x}}$ $\frac{\sqrt[3]{2x^2}}{x}$

Multiply.

10. $(7 + \sqrt{5})(1 + \sqrt{5})$
 $12 + 8\sqrt{5}$

11. $(6 + \sqrt{10})^2$
 $46 + 2\sqrt{10}$

12. $(5 + \sqrt{3})(2 - \sqrt{3})$
 $7 - 3\sqrt{3}$

Simplify each number.

13. $27^{\frac{2}{3}}$ 9

14. $25^{1.5}$ 125

15. $2^{\frac{3}{4}}$ $\sqrt[4]{8}$

Write each expression in simplest form.

16. $\left(x^{\frac{3}{2}}\right)^{-2}$ $\frac{1}{x^3}$

17. $\left(x^4\right)^{\frac{4}{3}}$ $x^{\frac{16}{3}}$

18. $\left(x^{-\frac{3}{8}}y^{\frac{1}{4}}\right)^{16}$ $\frac{y^4}{x^6}$

Solve.

19. $\sqrt{2x + 1} = 5$
 $x = 12$

20. $(x + 6)^{\frac{3}{4}} = 8$
 $x = 10$

21. $(x^2 + 13)^{\frac{1}{2}} = 7$
 $x = 6$ and $x = -6$

Chapter 6 Test (continued)

Form K

Let $f(x) = \sqrt{x} + 3$ and $g(x) = 4 - \sqrt{x}$. Perform each function operation and then find the domain.

22. $(f - g)(x)$ $(f - g)(x) = 2\sqrt{x} - 1$;
all real numbers ≥ 0

23. $(f \cdot g)(x)$ $(f \cdot g)(x) = \sqrt{x} - x + 12$;
all real numbers ≥ 0

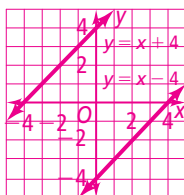
Let $f(x) = 3x + 1$ and $g(x) = x^2 + 2$. Find each value or expression.

24. $(f \circ g)(2)$ **19**

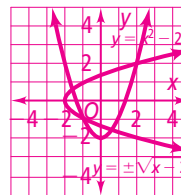
25. $(g \circ f)(-3)$ **66**

Graph each relation and its inverse.

26. $y = x + 4$



27. $y = x^2 - 2$



Rewrite each function to make it easy to graph using transformations of its parent function. Describe the graph.

28. $y = \sqrt{16x - 32}$ $y = 4\sqrt{x - 2}$;
vertical stretch of $y = \sqrt{x}$ by a factor of 4 and translation 2 units right

29. $y = \sqrt[3]{8x} + 3$ $y = 2\sqrt[3]{x} + 3$;
vertical stretch of $y = \sqrt[3]{x}$ by a factor of 2 and translation 3 units up

Do you UNDERSTAND?

30. **Error Analysis** Explain the error in this simplification of radical expressions.

What is the correct simplification? $\sqrt{2} \cdot \sqrt[3]{8} = \sqrt{2(8)} = \sqrt{16} = 4$

The product property does not apply to different indexes; $2\sqrt{2}$

31. **Reasoning** Show that $\sqrt[6]{x^3} = \sqrt{x}$ by rewriting $\sqrt[6]{x^3}$ in exponential form.

$\sqrt[6]{x^3} = x^{\frac{3}{6}} = x^{\frac{1}{2}} = \sqrt{x}$

32. A store is having a sale with a 15% discount on all items. In addition, employees get a \$20 discount on purchases of \$100 or greater. Will an employee get a better deal if the \$20 discount is applied first or if the 15% discount is applied first to their purchase of \$100? **The employee will pay less if the 15% discount is applied first.**