Unit 7 Assignment Calendar

Date	Day	Assignment
1/26/21 1/27/21	Wednesday Thursday	**7.1: Properties of Exponents** HW: 7.1 Practice
1/28/21 1/31/21	Friday Monday	**7.2: Simplifying Rational Exponents and Radicals** HW: 7.2 Practice
2/1/21 2/2/21	Tuesday Wednesday	**7.3: Key Features of Radical Functions** HW: 7.3 Practice
2/3/21 2/4/21	Thursday Friday	**7.4: Solving Equations with Exponents and Radicals** **HW:** 7.4 Practice
2/7/21 2/8/21	Monday Tuesday	**7.5: Compositions and Inverses** **HW:** 7.5 Practice
2/9/21 2/10/21	Wednesday Thursday	**7.6: Modeling** **HW:** 7.6 Practice
2/11/21 2/14/21	Friday Monday	**7.7: Factoring with Rational Exponents** **HW:** Ch 7 Practice Test (ODDS)
2/15/21 2/16/21	Tuesday Wednesday	**Chapter 7 Review Day** **HW**: Ch 7 Practice Test (EVENS)
2/17/21 2/18/21	Thursday Friday	**Chapter 7 TEST**

- **Expect Daily Quizzes.**
- **For help, try www.purplemath.com or www.khanacademy.com**
- **Any students completing 100% of their assignments for the semester will receive a 2% bonus. Students with no late assignments will also receive a pizza party!**

7.1 Practice Problems

For #1 – 16, simplify each expression (no decimal answers). Write all answers with positive exponents. Assume all variables have positive values. Show your work!

1) $\frac{(3x^{-5}y^{11}z^{-4})^3}{(-6x^2y^{-7}z^{-8})^2}$ 2) $(2y^4z^{-5})^{-3}(-3y^{-7}z^2)^4$ 3) $(-8a^3b^{-4}d^0)^{-2}$ 4) $\sqrt[3]{-8x^8}$ 5) $\sqrt[4]{162x^{12}y^9}$

6) $16^{1/2}$ 7) $\sqrt[4]{625x^8y^{13}z^{21}}$ 8) $(-27)^{4/3}$ 9) $(-216b^9)^{4/3}$

10) $24^{3/2}$ 11) $\left(\sqrt{4x^{12}}\right)^3$ 12) $(625)^{-3/4}$ 13) $\left(\sqrt[4]{16x^8}\right)^2$

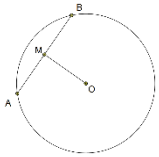
14) $(-2y^4z^{-3})^5(5y^{-3}z^{-4})^{-2}$ 15) $\frac{(-7x^{-5}y^9z^4)^{-2}}{(-3x^2y^{-7}z^{-8})^{-4}}$ 16) $\left(\sqrt[3]{-54x^{11}}\right)^4$

17) The population P of a certain animal species after *t* months can be modeled by $= C(1.21)^{t/3}$, where *C* is the initial population. Find the population after 33 months if the initial population is 21.

18) The amount of a certain type of medicine A remaining in a person's bloodstream can be modeled by the equation $A = A_o(0.455)^t$, where *t* is time in hours and A_o is the initial dose of medicine given. If an initial dose of 250mg is given, how many mg remain in a person's bloodstream after 90 minutes?

19) In the diagram shown, *M* is the midpoint of chord *AB* on circle *O*, *AB* = 16 centimeters, and *OM* = 15 centimeters. What is the radius of circle *O*?

A. 15 cm
B. 17 cm
C. 23 cm
D. 34 cm



Continued on next page…

20) Abandoned mines frequently fill with water. Before an abandoned mine can be reopened, the water must be pumped out. The size of pump required depends on the depth of the mine. If pumping out a mine that is D feet deep requires a pump that pumps a minimum of $\frac{D^2}{25} + 4D - 250$ gallons per minute, pumping out a mine that is 150 feet deep would require a pump that pumps a minimum of how many gallons per minute?

A. 362 B. 500 C. 800 D. 1,250 E. 1,750

7.2 Practice Problems

For #1 – 20, simplify each expression (no decimal answers). Write all answers with positive exponents. Assume all variables have positive values. Show your work!

1) $7^{1/3} \cdot 7^{4/3}$ 2) $(6^{2/3})^{3/4}$ 3) $\frac{4^{2/3}}{4^{1/3}}$ 4) $\frac{\sqrt[4]{32}}{\sqrt[4]{2}}$ 5) $\frac{\sqrt[3]{250}}{\sqrt[3]{2}}$

6) $\sqrt[4]{10} + 7\sqrt[4]{10}$ 7) $2(8^{1/5}) + 10(8^{1/5})$ 8) $5\sqrt{5} - \sqrt{45}$

9) $\sqrt[3]{27x^9}$ 10) $\sqrt[5]{\frac{x^{10}}{y^5}}$ 11) $\sqrt[5]{64a^8b^{14}c^5}$

12) $\sqrt{9w^5} - \sqrt{w^5}$ 13) $12\sqrt[3]{2z^5} - z\sqrt[3]{54z^2}$ 14) $\frac{-4}{\sqrt[3]{49}}$

15) $\frac{36^{1/4}}{5 \cdot 125^{1/4}}$ 16) $\frac{7x}{\sqrt[5]{2x^3}}$ 17) $\frac{\sqrt[4]{c^6} \cdot \sqrt[4]{c^2}}{\sqrt[4]{c^{10}}}$

18) $\sqrt[3]{x^8} \cdot \sqrt[4]{x^3}$ 19) $\sqrt[6]{y^5} \cdot \sqrt[4]{y^{11}}$ 20) $\sqrt[6]{x^7y} \cdot \sqrt[3]{x^2y^2}$

21) Simplify: $8\sqrt[3]{27} + \sqrt[3]{40} - 6\sqrt[3]{135}$

A. $24 - 16\sqrt[3]{5}$
B. $8\sqrt[3]{5}$
C. $8\sqrt[3]{3} - 16\sqrt[3]{5}$
D. $2\sqrt[3]{68}$

22) Simplify: $\frac{4^{\frac{2}{3}} \cdot 64^{\frac{2}{3}}}{4^{\frac{4}{3}}}$

A. $2 \cdot \sqrt[3]{2}$
B. $32 \cdot \sqrt[3]{2}$
C. 4
D. $4 \cdot \sqrt[3]{4}$

23) An industrial cleaner is manufactured using only the 3 secret ingredients A, B, and C, which are mixed in the ratio of 2:3:5, respectively, by weight. How many pounds of secret ingredient B are in a 42-pound (net weight) bucket of this cleaner?

A. 4.2 B. 12.6 C. 14.0 D. 18.0 E. 21.0

24) Two students make claims about the expression $y^{3/2}$. Each student's work supporting their claim is shown below.

Student #1	Student #2
Claim: $y^{3/2} = \left(\sqrt[3]{y}\right)^2$	Claim: $y^{3/2} = \sqrt{y^3}$
Work: $y^{3/2} = \left(y^{1/3} \cdot y^{1/3}\right)$	Work: $y^{3/2} = (y \cdot y \cdot y)^{1/2}$
$= \left(\sqrt[3]{y} \cdot \sqrt[3]{y}\right)$	$= \sqrt{y \cdot y \cdot y}$
$= \left(\sqrt[3]{y}\right)^2$	$= \sqrt{y^3}$

Which of the following statements about each student's work and claim is true?

A. Student 1 makes a correct claim and their supporting work shown is correct.
B. Student 1 makes an incorrect claim because $y^{\frac{3}{2}} = (y^2 \cdot y^2 \cdot y^2)^{\frac{1}{3}}$
C. Student 2 makes a correct claim and their supporting work shown is correct.
D. Student 2 makes an incorrect claim because $y^{3/2} = (y \cdot y)^{1/3}$.

7.3 Practice Problems

For #1 – 4, describe the transformation from the parent function, $y = \sqrt{x}$, identify the domain and range, and then sketch the graph.

1) $y = \sqrt{x+2} - 4$ 2) $y = -\sqrt{x-5}$ 3) $y = \frac{1}{4}\sqrt{x} + 3$ 4) $y = -3\sqrt{x-1} + 2$

For #5 – 8, describe the transformation from the parent function, $y = \sqrt[3]{x}$, identify the domain and range, and then sketch the graph.

5) $y = -\sqrt[3]{x-4} - 1$ 6) $y = \sqrt[3]{x+3} + 4$ 7) $y = -2\sqrt[3]{x} + 5$ 8) $y = \frac{1}{3}\sqrt[3]{x+2}$

For #9 – 14, simplify fully. No decimals or negative exponents should be in the answer. Show your work!

9) $(-3y^4z^{-3})^2(5y^{-3}z^{-4})^{-2}$ 10) $(-64)^{5/3}$ 11) $\left(\sqrt[4]{81x^{10}}\right)^2$ 12) $\frac{\sqrt[4]{243}}{\sqrt[4]{3}}$ 13) $\frac{2}{\sqrt{3}}$ 14) $\frac{5}{\sqrt[3]{5}}$

15) Describe the end behavior of the graph of #2. 16) Describe the end behavior of the graph of #1.

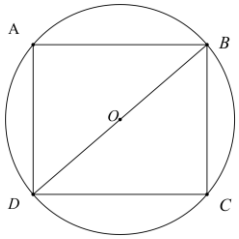
17) Simplify. Assume all variables are positive: $\frac{\sqrt[3]{c^5}\cdot\sqrt[3]{c^4}}{\sqrt[3]{c^{10}}}$

18) Find f(x) – g(x) and f(x) + g(x) if $f(x) = 5x^2 + 6x - 4$ *and* $g(x) = 3x^2 - 5x + 24$.

19) In the diagram below, square *ABCD* is inscribed inside circle *O*. The diameter of the circle *O* is 10 ft. What is the area of the square *ABCD*?

A. $10\ ft^2$ B. $50\ ft^2$

C. $100\ ft^2$ D. $200\ ft^2$



20) Given the function, $g(x) = 2\sqrt{x+4} + 8$, translate the function down three units, right one unit, and reflect it vertically. Write the equation for the function after the transformations.

21) Write the function $y = \sqrt[3]{x}$ after moving the graph left six units, up eleven units and stretching it vertically by a factor or 4.5.

7.4 Practice Problems

For #1 – 13: Solve each equation. Simplify radical answers. Show your work and check for extraneous solutions.

1) $3x^5 + 350 = -379$ 2) $\frac{1}{2}x^6 = 2048$ 3) $\sqrt{x+25} = 4$ 4) $\sqrt[3]{x} - 9 = -1$

5) $\sqrt{2x+5} = \sqrt{x+7}$ 6) $(x-2)^3 = -14$ 7) $2x^{3/2} = 108$

8) $\sqrt{x-6} = x - 8$ 9) $2\sqrt[3]{x-3} = 4$ 10) $x + 1 = \sqrt{7x+15}$

11) $(x+5)^4 = 16$ 12) $(x+3)^{5/2} = 32$ 13) $(x-4)^{2/3} - 9 = 16$

14) The volume of a cone is given by $V = \frac{1}{3}\pi r^2 h$, where *h* is the height of the cone, and *r* is the radius. Find the radius of a cone whose volume is 25 cubic inches and whose height is 6 inches. Write your answer as a simplified radical.

For # 15 – 18, simplify fully. No decimals or negative exponents in the final answer. Show your work!

15) $125^{4/3}$ 16) $\frac{3^{\frac{3}{4}}\cdot 9^{\frac{3}{4}}}{3^{\frac{11}{4}}}$ 17) $\frac{8e^{-4}f^{-2}}{18ef^{-5}}$ 18) $\frac{\sqrt[3]{x^5}\cdot\sqrt[3]{x^{10}}}{\sqrt[3]{x^2}}$

19) The volume of a sphere is given by the formula $V = \frac{4}{3}\pi r^3$. Assume the moon is a perfect sphere. If the volume of the moon is approximately 21,900,000,000 km^3 (21.9 billion cubic km), then find the diameter of the moon, to the nearest km.

20) The volume of a sphere is given by the formula $V = \frac{4}{3}\pi r^3$. Assume the earth is a perfect sphere. If the volume of the earth is approximately 1,080,000,000,000 km^3 (1.08 trillion cubic km), then find the diameter of the earth, to the nearest km.

21) Solve: $5\sqrt{2x-1} + 12 = 7$ 22) $\sqrt{x+2} = 2 - \sqrt{x}$ 23) $\sqrt{x+21} = 3 + \sqrt{x}$

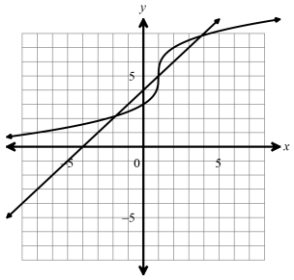
24) Multiple Choice: $\frac{4}{\sqrt{2}} + \frac{2}{\sqrt{3}} = ?$

A. $\frac{4\sqrt{3}+2\sqrt{2}}{\sqrt{5}}$ B. $\frac{4\sqrt{3}+2\sqrt{2}}{\sqrt{6}}$ C. $\frac{6}{\sqrt{2}+\sqrt{3}}$ D. $\frac{6}{\sqrt{5}}$ E. $\frac{8}{\sqrt{6}}$

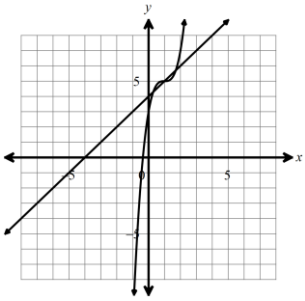
Continued on next page…

25. A student solves the equation $\sqrt[3]{x-1}+5=x+4$ by graphing each side of the equation on the same coordinate plane. Which of the following graphs shows the correct solutions to the equation above?

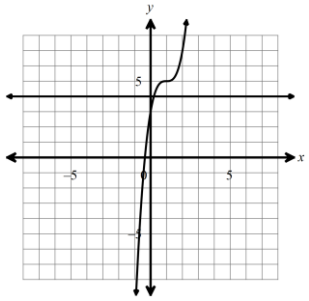
A.



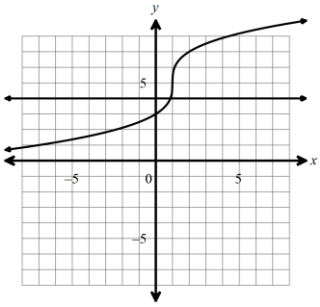
C.



B.



D.



7.5 Practice Problems

For # 1 – 4: Find the inverse of the following functions.

1) $f(x) = 64x^3$ 2) $f(x) = 5x + 20$ 3) $h(x) = -x^2 + 25$ 4) $g(x) = 27x^3 + 9$

For #5 – 8, find the following if $f(x) = -4x^{\frac{1}{2}}$ and $g(x) = 6x^{\frac{1}{2}}$. Also, name the domain of each composition.

5) $f(x) + g(x)$ 6) $\frac{f(x)}{g(x)}$ 7) $f(x) - g(x)$ 8) $f(x) \cdot g(x)$

For # 9 – 12: Let $f(x) = 2x^{-1}$ and $g(x) = 4x + 3$. Find the following compositions and their domains.

9) $f(g(x))$ 10) $g(f(x))$ 11) $f(f(x))$ 12) $g(g(x))$

13) If $h(x) = 9x^2$, find h^{-1}. Then graph both relations.

14) If $g(x) = 216x^3$, find g^{-1}. Then graph both relations.

For # 15 – 17: Are the following relations inverses? Explain your reasoning.

15) $f(x) = 8x^3$ and $g(x) = 2x^{1/3}$ 16) $f(x) = 3x+1$ and $g(x) = \frac{x}{3} - \frac{1}{3}$ 17) $f(x) = -x^2 + 4$ and $g(x) = 2x^2$

18) The relation $a(x)$ passes the horizontal line test. What information does this tell you about a^{-1}?

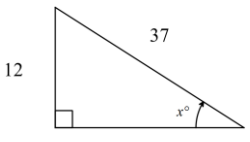
19) For the relation $y = -\frac{1}{3}\sqrt{x-2}+4$, describe the transformation from the parent function, $y = \sqrt{x}$, identify the domain and range, and then sketch the graph.

20) For the relation $y = 2\sqrt[3]{x} - 5$, describe the transformation from the parent function, $y = \sqrt[3]{x}$, identify the domain and range, and then sketch the graph.

For #21 – 23, simplify fully. No decimals or negative exponents should be in the answer. Show your work!

21) $4\sqrt[4]{48} - \sqrt[4]{3} + \sqrt[4]{243}$ 22) $\frac{3^{\frac{1}{3}} \cdot 27^{\frac{2}{3}}}{3^{\frac{14}{3}}}$

23) Look at the diagram. What is the cos (x°)?



24. Find the inverse of f(x) = $\frac{1}{6}x^3+8$

A. $f^{-1}(x)=6x^3-8$ C. $f^{-1}(x)=\sqrt[3]{6x}-2$

B. $f^{-1}(x)=\sqrt[3]{6x+8}$ D. $f^{-1}(x)=\sqrt[3]{6x-48}$

Continued on next page…

25. Determine whether $f(x)=x-3$ and $g(x)=-x+3$ are inverse functions. Explain.
A. $f(x)$ and $g(x)$ are inverse functions because $f(x)+g(x)=0$
B. $f(x)$ and $g(x)$ are inverse functions because $f(g(x))=-x$
C. $f(x)$ and $g(x)$ are not inverse functions because $f(x)g(x)=-1$
D. $f(x)$ and $g(x)$ are not inverse functions because $f(g(x))=-x$

7.6 Practice Problems

1) The function s(l)=1.34$\sqrt{l}$ models the maximum speed s in knots for a sailboat with length l in feet at the waterline.
a. Use the model to find the length of a sailboat with a maximum speed of 12 knots. Round to the nearest foot.
b. Explain how you can check your solution using a graphing calculator. Then use the method you described to check your result.

2) The function a(h)=20$\sqrt[3]{h-8.3}+40$ models the age a in years of a sassafras tree that is h meters high.
a. Use the model to find the height of the sassafras tree when it was 50 years old. Round to the nearest tenth of a meter.
b. Explain how you can check your solution using a graphing calculator. Then use the method you used to check your result.

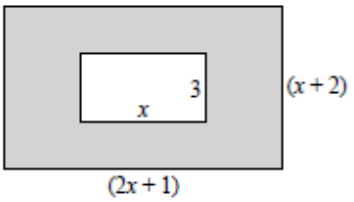
3) When a car skids to a stop on a dry asphalt road, the equation s=$\sqrt{21d}$ models the relationship between the car's speed s in miles per hour at the beginning of the skid and the distance d in feet that the car skids.
a. Use the model to find the distance that a car will skid to a stop if it is traveling at 40 miles per hour at the beginning of the skid. Round to the nearest foot.
b. Use the model to find the distance that a car will skid to a stop if it is traveling at 20 miles per hour at the beginning of the skid. Round to the nearest foot. Compare this result with the result from part (a), where the speed was twice as great.
c. A car skids to a stop and leaves skid marks that are 65 feet long. The speed limit on the road is 35 miles per hour. Was the car speeding when it went into the skid? Explain.

4) A student solves $\sqrt{-2x-12}=x+6$ and gets the apparent solutions x= -6 or x = -8. Explain how the student could use a graph to determine whether either of the apparent solutions is extraneous.

5) The equation $v=6.3\sqrt{1013-p}$ represents the mean sustained wind velocity, where p is the air pressure measured in millibars at the center of the hurricane. Find the air pressure to the nearest tenth of a millibar in a Category 4 hurricane with a wind velocity of 145 miles per hour.

6) A model for the duration of a storm is given by the function $f(d)=.07\left(\sqrt{d}\right)^3$, where $f(d)$ is the duration of the storm in hours, and d is the diameter of the storm in miles. If a storm lasts for 3 hours, will a person who is hiking 7 miles from the center of the storm be in the area theoretically covered by the storm? Explain.

7) The figure below shows a smaller rectangle inside a larger rectangle.



What is the area of the shaded region?
A. $2x^2+2x+2$
B. $2x^2+3x+2$
C. $2x^2+5x+2$
D. $2x^2+8x+2$

Unit 7 Practice Test

For #1-3: factor completely.

1) $2x^{\frac{1}{2}}+12x^{-\frac{1}{2}}$ 2) $7(2x+3)^{-\frac{1}{2}}+2(2x+3)^{\frac{1}{2}}$ 3) $3(x+2)^4-6(x+2)^3$

For #4 – 16: Simplify completely. No decimals or negative exponents in the final answer. Show your work!

4) $(3x^2\cdot 2x)^4$ 5) $(-3b^2c^{-7})^4(-2b^5c^{-8})^{-3}$ 6) $\left(\frac{b^3}{b^9}\right)^{-1}$ 7) $\frac{4}{\sqrt{5x}}$ 8) $\frac{3a}{\sqrt[3]{25a}}$ 9) $\left(\sqrt[4]{243d^5}\right)^3$

10) $-32^{\frac{4}{5}}$ 11) $\sqrt[8]{x^3}\cdot\sqrt[3]{x}$ 12) $\left(4^{5/2}\right)^4$ 13) $\sqrt[5]{160x^3y^{14}z^{20}}$ 14) $\sqrt[4]{\frac{x^5}{y^{16}}}$

15) $\frac{\sqrt[4]{81h}}{\sqrt[4]{2h^3}}$ 16) $\sqrt[3]{2}-2\sqrt[3]{128}$ 17) $xy^4\sqrt[4]{243x^7}-8\sqrt[4]{3x^{11}y^{16}}$

For #18 – 23, find the requested expression if $f(x) = 3x^{-1}$ and $g(x) = 6x^{-1}$. Find the domain.

18) $f(x) + g(x)$ 19) $f(x) - g(x)$ 20) $f(x) \cdot g(x)$ 21) $\frac{f(x)}{g(x)}$ 22) $g(f(x))$ 23) $f(f(x))$

24) The volume of a sphere is given by the formula $V = \frac{4}{3}\pi r^3$. Assume Pluto is a perfect sphere. If the volume of Pluto is approximately 7,150,000,000 km^3 (7.15 billion cubic km), then find the diameter of the Pluto, to the nearest km.

25) Are the following functions inverses? Explain your reasoning. $f(x) = 27x^3$ and $g(x) = \frac{\sqrt[3]{x}}{3}$.

26) If $a(x) = 625x^4$ and $x \geq 0$, then find a^{-1}. 27) If $g(x) = \frac{\pm\sqrt{x}}{5}$, then find g^{-1}. Graph both functions on the same coordinate system.

For #28 – 29, describe the transformation from the parent function $y = \sqrt{x}$. Then graph each function and state the domain and range.

28) $y = -\sqrt{x-4} - 2$ 29) $y = \frac{1}{3}\sqrt{x} + 5$

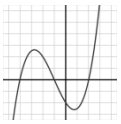
For #30 – 37: Solve the following equations. Check for extraneous solutions. If needed, write answers in simplified radical form.

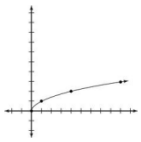
30) $\sqrt[3]{5x-1} + 6 = 10$ 31) $x = \sqrt{4x-3}$ 32) $-5\sqrt[3]{x-1} = 40$ 33) $x^{2/3} = 12$
34) $-9x^5 = -69{,}984$ 35) $(x-3)^{3/5} - 12 = 52$ 36) $x - 3 = \sqrt{x-1}$ 37) $\frac{1}{2}x^4 = 2048$

For #38 – 39, describe the transformation from the parent function $y = \sqrt[3]{x}$. Then graph each function and state the domain and range.

38) $y = 3\sqrt[3]{x+5} - 2$ 39) $y = -\sqrt[3]{x-2}$

For #40 – 41, use the graph of $a(x)$ to determine whether or not a^{-1} is a function.

40) 

41) 

42) Solve: $\sqrt{x+5} = \sqrt{x} - 5$

43) Solve: $\sqrt{8x+3} = -2$

A. $x = \frac{-1}{8}$
B. $x = \frac{1}{8}$
C. $x = \frac{5}{8}$
D. *no solution*

44. Let $f(x) = \sqrt[3]{x}$ and let $g(x)$ be a translation of $f(x)$ expressed as $g(x) = f(x-27)$. What are the coordinates of the x-intercept of $g(x)$?

A. (3, 0) B. (-3, 0) C. (27, 0) D. (-27, 0)

7.1 Practice Problems ANSWERS

1) $\frac{3y^{47}z^4}{4x^{19}}$ 2) $\frac{81z^{23}}{8y^{40}}$ 3) $\frac{b^8}{64a^6}$ 4) $-2x^2 \cdot \sqrt[3]{x^2}$ 5) $3x^3y^2 \cdot \sqrt[4]{2y}$ 6) 4
7) $5x^2y^3z^5\sqrt[4]{yz}$ 8) 81 9) $1296b^{12}$ 10) $48\sqrt{6}$ 11) $8x^{18}$
12) $\frac{1}{125}$ 13) $4x^4$ 14) $\frac{-32y^{26}}{25z^7}$ 15) $\frac{81x^{18}}{49y^{46}z^{40}}$
16) $162x^{14} \cdot \sqrt[3]{2x^2}$ 17) around 171 18) 76.7 mg 19) B 20) D

7.2 Practice Problems ANSWERS

1) $7^{5/3}$ 2) $6^{1/2}$ or $\sqrt{6}$ 3) $4^{1/3}$ or $\sqrt[3]{4}$ 4) 2 5) 5

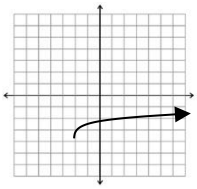
6) $8 \cdot \sqrt[4]{10}$ 7) $12(8)^{1/5}$ 8) $2\sqrt{5}$ 9) $3x^3$ 10) $\frac{x^2}{y}$ 11) $2ab^2c \cdot \sqrt[5]{2a^3b^4}$

12) $2w^2\sqrt{w}$ 13) $9z \cdot \sqrt[3]{2z^2}$ 14) $\frac{-4\sqrt[3]{7}}{7}$ 15) $\frac{\sqrt[4]{180}}{25}$ 16) $\frac{7 \cdot \sqrt[5]{16x^2}}{2}$ 17) $\frac{\sqrt{c}}{c}$

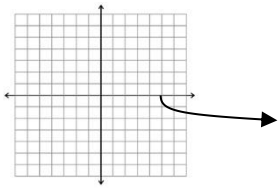
18) $\sqrt[12]{x^{41}}$ 19) $\sqrt[12]{x^{43}}$ 20) $x\sqrt[6]{x^5y^5}$ 21) A 22) D 23) B 24) C

7.3 Practice Problems ANSWERS

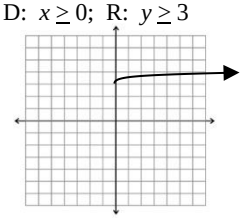
1) left 2, down 4
D: $x \geq -2$; R: $y \geq -4$



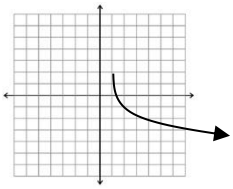
2) reflection over $y = 0$, right 5
D: $x \geq 5$; R: $y \leq 0$



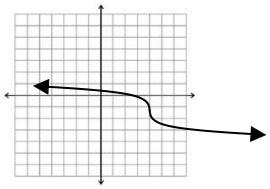
3) vertical compression by a factor of 4, up 3
D: $x \geq 0$; R: $y \geq 3$



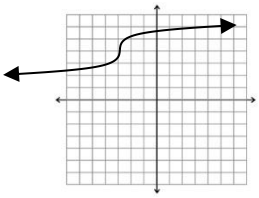
4) reflection over $y = 2$, vertical stretch by a factor of 3, right 1, up 2
D: $x \geq 1$; R: $y \leq 2$



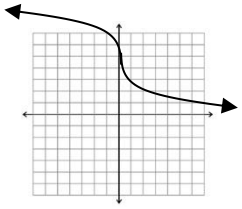
5) reflection over $y = -1$, right 4, down 1
D: $\mathbb{R}$ R: $\mathbb{R}$



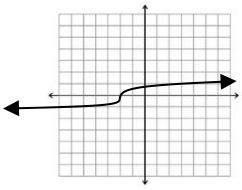
6) left 3, up 4
D: $\mathbb{R}$ R: $\mathbb{R}$



7) reflection over $y = 5$, vertical stretch by a factor of 2, up 5
D: $\mathbb{R}$ R: $\mathbb{R}$



8) vertical compression by a factor of 3 left 2
D: $\mathbb{R}$ R: $\mathbb{R}$



9) $\frac{9y^{14}z^2}{25}$ 10) -1024

11) $9x^5$ 12) 3 13) $\frac{2\sqrt{3}}{3}$

14) $\sqrt[3]{25}$ 15) As $x \to \infty, f(x) \to -\infty$.

16) As $x \to \infty, f(x) \to \infty$.

17) $\frac{\sqrt[3]{c^2}}{c}$

18) $f(x) - g(x) = 2x^2 + 11x - 28 \; and \; f(x) + g(x) = 8x^2 + x + 20$

19) B 20) $g(x) = -2\sqrt{x+3} + 5$ 21) $y = 4.5\sqrt[3]{x+6} + 11$

7.4 Practice Problems ANSWERS

1) -3 2) ± 4 3) -9 4) 512 5) 2 6) $2 + \sqrt[3]{-14}$

7) $9\sqrt[3]{4}$ 8) 10 9) 11 10) 7 11) -7, -3 12) 1

13) -121, 129 14) $\frac{5\sqrt{2\pi}}{2\pi}$ 15) 625 16) $\frac{\sqrt{3}}{3}$ 17) $\frac{4f^3}{9e^5}$ 18) $x^4\sqrt[3]{x}$

19) approx 3,471 km 20) approx 1.273 trillion km 21) No solution 22) ¼ 23) 4 24) B 25) A

7.5 Practice Problems ANSWERS

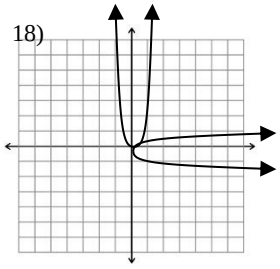
1) $f(x)^{-1} = \frac{1}{4}x^{\frac{1}{3}}$ 2) $f(x)^{-1} = \frac{1}{5}x - 4$ 3) $h(x)^{-1} = \pm\sqrt{25 - x}$ 4) $g(x)^{-1} = \sqrt[3]{\frac{1}{27}x - \frac{1}{3}}$ or $\frac{1}{3}\sqrt[3]{x - 9}$

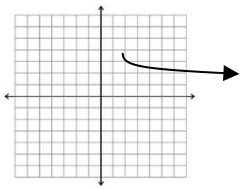
5) $2x^{1/2}$; D: $x \geq 0$ 6) -2/3; D: $x > 0$ 7) $-10x^{1/2}$; D: $x \geq 0$ 8) $-24x$; D: $x \geq 0$

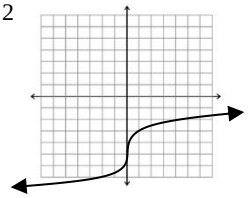
9) $\frac{2}{4x+3}$ D: $x \neq -\frac{3}{4}$ 10) $\frac{8}{x} + 3$ or $\frac{8+3x}{x}$; D: $x \neq 0$ 11) x; D: $x \neq 0$ 12) $16x + 15$; D: all real #s

13) $h^{-1} = \pm\frac{\sqrt{x}}{3}$ 14) $g^{-1} = \frac{1}{6}x^{\frac{1}{3}}$

15) No, $f(g(x)) \neq g(f(x)) \neq x$ 16) Yes, $f(g(x)) = g(f(x)) = x$ 17 No, $f(g(x)) \neq g(f(x)) \neq x$ 13) a^{-1} is a function

18) 

19) reflection over $y = 4$; vertical compression by a factor of 3; right 2, up 4
D: $x \geq 2$; R: $y \leq 4$


20) vertical stretch by a factor of 2 down 5
D: all real #s; R: all real #s


21) $10\sqrt[4]{3}$ 22) $\frac{\sqrt[3]{9}}{27}$ 23) 35/37 24) D 25) D

7.6 Practice Problems ANSWERS

1. a. 80 ft b. Graph the functions f(x)=12 and g(x)=1.34$\sqrt{x}$. Find the x coordinate of the point where they intersect.
2. a. 8.4 meters b. Graph the functions and find the x-coordinate at the point of intersection of the two graphs.
3. a. 76 ft b. 19 ft; a speed that is twice as great results in a skid that is 4 times as long c. yes. Example explanation: if the car were traveling at 35 mi/h, its skid marks would have been about 58 ft long. Since the skid marks were longer than this, the car mush have been speeding.
4. example answer: graph the functions and determine whether the graphs intersect when x=-6. If they do not, then x=-6 is an extraneous solution. Do this also for $x = -8$.
5. 483.3 millibars 6. No. The radius of the storm is about 6.12 miles. 7. A

Unit 7 Practice Test ANSWERS

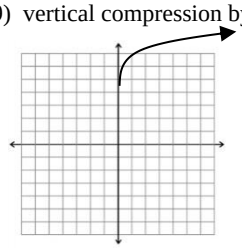
1) $\frac{2(x+6)}{\sqrt{x}}$ 2) $\frac{4x+13}{\sqrt{2x+3}}$ 3) $3x(x+2)^3$ 4) $1296x^{12}$ 5) $\frac{-81}{8b^7c^4}$ 6) b^6 7) $\frac{4\sqrt{5x}}{5x}$ 8) $\frac{3\cdot\sqrt[3]{5a^2}}{5}$

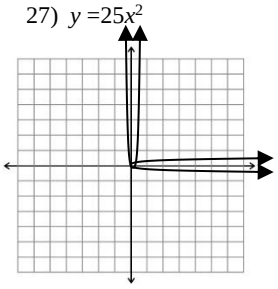
9) $27d^3 \cdot \sqrt[4]{27d^3}$ 10) 16 11) $x^{\frac{17}{24}}$ 12) 1,048,576 13) $2y^2z^4 \cdot \sqrt[5]{5x^3y^4}$

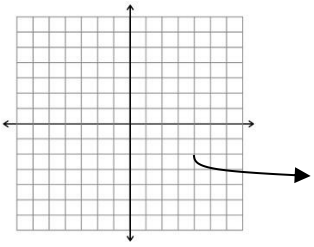
14) $\frac{x^4\sqrt{x}}{y^4}$ 15) $\frac{3\sqrt[4]{8h^2}}{2h}$ 16) $-7\sqrt[3]{2}$ 17) $-5x^2y^4\sqrt[4]{3x^3}$ 18) $9x^{-1}$ or $\frac{9}{x}$, where $x \neq 0$ 19) $-3x^{-1}$ or $\frac{-3}{x}$, where $x \neq 0$

20) $\frac{18}{x^2}$, where $x \neq 0$ 21) ½ 22) $2x$, where $x \neq 0$ 23) x, where $x \neq 0$ 24) approx 2390 km

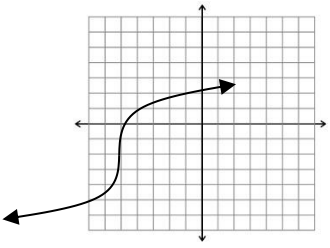
25) Yes, $f(g(x)) = g(f(x)) = x$. 26) $y = \frac{\sqrt[4]{x}}{5}$ 27) $y = 25x^2$ 28) reflection over $y = -2$, right 4, down 2

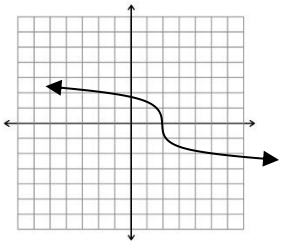
29) vertical compression by a factor of 3, up 5






30) 13 31) 1 and 3 32) -511 33) $\pm 24\sqrt{3}$ 34) 6 35) 1027
36) 5 37) ± 8

38) vertical stretch by a factor of 3, left 5, down 2
D: all real #s
R: all real #s


39) reflection in $y = 0$
Right 2
D: all real #s
R: all real #s


40) no

41) yes 42) No Solution 43) D 44) C