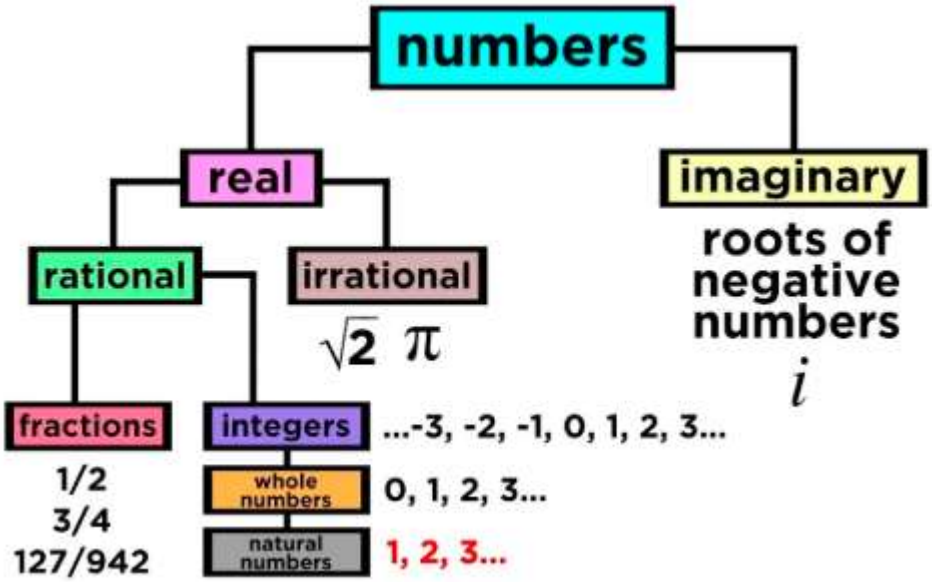
Name: _____

Block: ___

1.1a Real Number System



REAL NUMBERS

-all numbers that can be expressed in decimal form

IRRATIONAL NUMBERS ($\bar{Q}$)

-when converted to decimal form they are:

****non-terminating***

****non–repeating***

RATIONAL NUMBERS (Q)

-numbers that can be written in fraction form.

NATURAL NUMBERS (N)

WHOLE NUMBERS (W)

INTEGERS (I)

1.1b Intro to Radicals/Roots of Fractions

What is the square root of 25? What does that mean? Can you determine the square root of 24?

Perfect square is the _____ of two _____ integers. List the perfect squares to 100. Can you list the perfect cubes to 100?

Roots or radicals are the "opposite" operation of applying exponents; we can "undo" a power with a radical, and vise versa. For example:

$3^2 = 9$ and $\sqrt{9} = 3$

$\sqrt[3]{8} = 2$ and $2^3 = 8$

Notice the relationship between the index and the exponent.

What number squared gives you 49 is the same question as what is the square root of 49.

$x^2 = 49$ is the same as $\sqrt{49} = x$

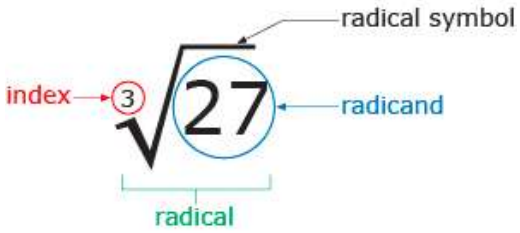
Principal square root of a number is the _____ square root of that number. For example:

$(4)(4) = 16$ and $(-4)(-4) = 16$ so the square root of 16 could be 4 or -4

When it is written $\sqrt{16} = 4$ ← the principal (***positive***) square root

To indicate the negative square root → $-\sqrt{16} = -4$

Parts of a Radical



The **division (quotient) property** of radicals:

$$\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$$

This **property** allows you to split the radical between the numerator and denominator of the fraction. For example:

$$\sqrt[3]{\frac{8}{27}} = \frac{\sqrt[3]{8}}{\sqrt[3]{27}} = \frac{2}{3}$$

Ex. $\sqrt[5]{\frac{1}{32}} = - = -$

Ex. $\sqrt[3]{-} = - = \frac{4}{5}$

HW: 1.1 WS

1.1 WS

1. Is each number rational or irrational? Justify your answer.
   a) $\frac{59}{32}$
   b) 3.65
   c) $\sqrt{16}$
   d) $\sqrt{\frac{5}{100}}$
   e) $\sqrt{2.25}$
   f) $\sqrt[3]{-10000}$

2. Give an example of each number that is:
   a) A whole number that is not a natural number
   b) An integer that is not a whole number
   c) A rational number that is not an integer

3. a) List the perfect squares of numbers 1 to 10.
   b) List the perfect cubes of numbers 1 to 10.

4. Without evaluating the radical, between which two integers is the value of each:
   a) $\sqrt{75}$
   b) $\sqrt{105}$
   c) $\sqrt[3]{52}$
   d) $\sqrt[4]{25}$

5. Estimate each radical to one decimal place.
   a) $\sqrt{20}$
   b) $\sqrt{76}$
   c) $\sqrt{116}$
   d) $\sqrt[3]{20}$
   e) $\sqrt[3]{60}$
   f) $\sqrt[3]{100}$

6. Evaluate each radical. Leave your answer as a fraction in lowest terms.
   a) $\sqrt{\frac{1}{9}}$
   b) $\sqrt{\frac{4}{25}}$
   c) $\sqrt{\frac{49}{16}}$
   d) $\sqrt{\frac{81}{64}}$
   e) $\sqrt{\frac{144}{100}}$
   f) $\sqrt{\frac{128}{18}}$
   g) $\sqrt{\frac{48}{147}}$
   h) $\sqrt{\frac{150}{54}}$

7. Evaluate each radical. Leave your answer as a fraction in lowest terms.
   a) $\sqrt[3]{\frac{1}{27}}$
   b) $\sqrt[3]{\frac{125}{8}}$
   c) $\sqrt[3]{\frac{1000}{27}}$
   d) $\sqrt[3]{\frac{1}{1000000}}$
   e) $\sqrt[3]{\frac{24}{81}}$
   f) $\sqrt[3]{\frac{128}{250}}$
   g) $\sqrt[3]{\frac{500}{108}}$
   h) $\sqrt[3]{\frac{81}{3000}}$
   i) $\sqrt[4]{\frac{2401}{81}}$

8. Evaluate each radical, if possible.
   a) $\sqrt[3]{-1}$
   b) $\sqrt{-49}$
   c) $\sqrt[3]{-64}$
   d) $\sqrt{-100}$

9. Write each number below as a: **i)** square root and **ii)** cube root
   a) 5
   b) 7
   c) 0.9
   d) 1.5
   e) $\frac{9}{8}$

1.2 Simplifying Radicals

Radicals can be written in two forms:

Entire Radical: When all numbers are found under the radical sign and the coefficient is 1.
➔ Entire radicals are in the form: $\sqrt{x}$

Mixed Radical: When the radical is being multiplied by a coefficient other than 1.
➔ Mixed radicals are in the form: $a\sqrt{x}$

We can express all mixed radicals as entire radicals and many entire radicals can be **simplified** to mixed radicals. To convert between these two forms, we use…

The **multiplication (product) property** of radicals

$$\sqrt[n]{a \cdot b} = \sqrt[n]{a} \cdot \sqrt[n]{b}$$

Entire to Mixed

1. _____

2. _____

Ex. #1: Simplify each radical (express the entire radicals as mixed radicals).

(a) $\sqrt{12}$ **(b)** $\sqrt{45}$ **(c)** $\sqrt{72}$ **(d)** $\sqrt[3]{144}$

Mixed to Entire

1. _____

2. _____

Ex. #2: Express the following mixed radicals as entire radicals.

(a) $5\sqrt{3}$ **(b)** $2\sqrt{7}$ **(c)** $3\sqrt[3]{4}$

HW: 1.2 WS

1.2 WS

1. Identify if each number is a mixed or entire radical: $\sqrt{56}$, $4\sqrt{3}$, $\sqrt[3]{180}$, $5\sqrt[4]{6}$, $5\sqrt[3]{2}$, $\sqrt[6]{8}$, $10\sqrt[3]{2}$

Mixed radicals	Entire radicals

2. Determine the greatest perfect square factor of each.
   a) 20
   b) 18
   c) 38
   d) 45
   e) 50
   f) 85

3. Determine the greatest perfect cube factor of each.
   a) 16
   b) 35
   c) 27
   d) 24
   e) 30
   f) 54

4. Simplify each radical.
   a) $\sqrt{99}$
   b) $-\sqrt{108}$
   c) $\sqrt{96}$
   d) $\sqrt[3]{375}$
   e) $\sqrt[3]{108}$
   f) $\sqrt[3]{256}$

5. Simplify each radical.
   a) $\sqrt{300}$
   b) $-\sqrt{360}$
   c) $\sqrt[3]{81}$
   d) $-\sqrt[3]{12000}$

6. Write each mixed radical as an entire radical.
   a) $-5\sqrt{7}$
   b) $9\sqrt{6}$
   c) $8\sqrt{10}$
   d) $-3\sqrt[3]{12}$
   e) $4\sqrt[3]{10}$
   f) $10\sqrt[3]{9}$

7. The area of a square is 150 cm^2. Write the side length of the square a mixed radical.

8. The volume of a cube is 560 cm^3. Write the edge length of the cube in simplest form.

1.3 Negative Exponents

Warm Up:

Evaluate each power.

a) 7^2 = b) -7^2 = c) $(-7)^2$ = d) $-(7)^2$ = e) $-(-7)^2$ =

Brackets influence the solution by _____

Write the reciprocal.

a) $2 \rightarrow$ b) $-6 \rightarrow$ c) $\frac{1}{2} \rightarrow$ d) $-\frac{101}{23} \rightarrow$

NEGATIVE EXPONENT LAW

$\frac{2^2}{2^5} =$ OR $\frac{2^2}{2^5} =$

By the transitive property… $\mathbf{2^{-3}}$ **=**

Algebra: $x^{-n} = \frac{1}{x^n}$ where x can be any number but 0.

_____

_____

Example 1: Simplify.

a) 3^{-2} b) $(-3)^{-2}$ c) 0.3^{-4}

Algebra: $\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^{+n}$ where a, b can be any number but 0.

_____

_____

Example 2: Simplify and evaluate.

a) $\left(\frac{5}{4}\right)^{-2}$ b) $\left(-\frac{3}{4}\right)^{-3}$ c) $\left(\frac{10}{3}\right)^{-3}$

OOPS! You don't learn this until next section!

Example 3: Evaluate without using a calculator. ** Remember $x^{\frac{m}{n}} = \sqrt[n]{x^m}$ **

a) $8^{-\frac{2}{3}}$ b) $\left(\frac{9}{16}\right)^{-\frac{3}{2}}$ c) $(-0.027)^{-\frac{2}{3}}$

HW: 1.3 WS

1.3 WS

1. Write the reciprocal of each number.

   a. 4

   b. -6

   c. $\frac{7}{8}$

   d. $-\frac{3}{5}$

2. Evaluate each power without using a calculator and answer as a fraction in lowest terms.

   a. 9^2 and 9^{-2}

   b. 4^3 and 4^{-3}

   c. $(-1)^{12}$ and $(-1)^{-12}$

   d. $(-2)^4$ and $(-2)^{-4}$

   e. $(-5)^3$ and $(-5)^{-3}$

   f. -7^2 and -7^{-2}

3. Write each power with a positive exponent.

   a. 4^{-5}

   b. $(-8)^{-4}$

   c. -9^{-3}

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

   e. $\left(-\frac{4}{5}\right)^{-4}$

   f. $-\left(\frac{5}{6}\right)^{-7}$

4. Evaluate each power without using a calculator and answer as a fraction in lowest terms.

   a. 4^{-2}

   b. $(-3)^{-4}$

   c. -5^{-3}

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

   e. $\left(-\frac{5}{6}\right)^{-2}$

   f. $-\left(\frac{3}{2}\right)^{-4}$

   g. $\left(-\frac{3}{5}\right)^{-3}$

   h. $-\left(-\frac{4}{3}\right)^{-2}$

5. Write each number as a power with a negative integer exponent.

   a. $\frac{1}{2}$

   b. 3

   c. -5

   d. $\frac{1}{9}$

   e. -4

1.4 Rational Exponents

A. Use a calculator to complete the tables.

x	$x^{\frac{1}{2}}$
1	
4	
9	
16	

x	$x^{\frac{1}{3}}$
1	
8	
27	
64	

Notice the pattern:

$\sqrt{x}$ **the** _____ **as a power is** _____

$\sqrt[3]{x}$ **the** _____ **as a power is** _____

$\sqrt[5]{x}$ **the** _____ **as a power is** _____

IN GENERAL $x^{\frac{1}{n}}$ as a radical becomes $\sqrt[n]{x}$. And vice versa, $\sqrt[n]{x}$ equals $x^{\frac{1}{n}}$.

Example 1: Write as a radical and then evaluate.

a) $\mathbf{1000^{\frac{1}{3}}}$ **b)** $\mathbf{0.25^{\frac{1}{2}}}$ **c)** $\left(\frac{16}{81}\right)^{\frac{1}{4}}$

$x^{\frac{m}{n}}$ ← *Exponent of the root or radicand*

← *Index of the root (little #)*

so $x^{\frac{m}{n}} = \sqrt[n]{x^m}$ or $\left(\sqrt[n]{x}\right)^m$

Example 2: Write $26^{\frac{2}{5}}$ in radical form **two** ways.

a) b)

Example 3: Write as an exponent.

a) $\sqrt{3^5}$ b) $\left(\sqrt[3]{25}\right)^2$

Example 4: Write as a radical and then evaluate.

a) $8^{\frac{2}{3}}$ b) $(-27)^{\frac{4}{3}}$ c) $(-32)^{0.4}$

Example 5: Evaluate without using a calculator. ** Remember $x^{\frac{m}{n}} = \sqrt[n]{x^m}$ **

a) $8^{-\frac{2}{3}}$ b) $\left(\frac{9}{16}\right)^{-\frac{3}{2}}$ c) $(-0.027)^{-\frac{2}{3}}$

HW: 1.4 WS

1.4 WS

1. Write each power with a positive rational exponent.

   a. $48^{-\frac{1}{2}}$

   b. $\left(\frac{30}{49}\right)^{-\frac{1}{4}}$

   c. $\left(\frac{1}{18}\right)^{-\frac{1}{3}}$

   d. $(56)^{-0.25}$

   e. $\left(-\frac{2}{45}\right)^{-\frac{1}{3}}$

   f. $-\left(\frac{3}{10}\right)^{-\frac{1}{2}}$

   g. $(4.5)^{-\frac{1}{3}}$

   h. $\left(-\frac{8}{16}\right)^{-0.2}$

2. Evaluate each power without using a calculator and answer as a fraction in lowest terms.

   a. $36^{-\frac{1}{2}}$

   b. $1000^{-\frac{1}{3}}$

   c. $-16^{-\frac{1}{4}}$

   d. $(-27)^{-\frac{1}{3}}$

3. Evaluate each power without using a calculator and answer as a fraction in lowest terms.

   a. $25^{-0.5}$

   b. $(-32)^{-0.2}$

   c. $(10000)^{-0.25}$

   d. $-81^{-0.5}$

   e. $0.25^{-0.5}$

   f. $0.0081^{-0.25}$

4. Write each power in the form $\sqrt[n]{\left(\frac{b}{a}\right)^m}$, then evaluate each power without using a calculator and answer as a fraction in lowest terms.

   a. $8^{-\frac{2}{3}}$

   b. $\left(\frac{1}{100}\right)^{-\frac{3}{2}}$

   c. $-\left(\frac{4}{32}\right)^{-\frac{2}{3}}$

   d. $(-0.008)^{-\frac{2}{3}}$

5. Write each power in the form $\sqrt[n]{\left(\frac{b}{a}\right)^m}$, then evaluate each power without using a calculator and answer as a fraction in lowest terms.

   a. $16^{-\frac{5}{4}}$

   b. $\left(\frac{27}{8}\right)^{-\frac{2}{3}}$

   c. $\left(-\frac{27}{125}\right)^{-\frac{4}{3}}$

   d. $-0.01^{-2.5}$

   e. $\left(\frac{81}{16}\right)^{-0.75}$

   f. $-32^{-1.2}$

   g. $\left(\frac{20}{45}\right)^{-2.5}$

   h. $\left(-\frac{5}{40}\right)^{-\frac{7}{3}}$

6. Write each number as a power with exponent $\frac{1}{2}$, then as a power with exponent $-\frac{1}{2}$.

   a. $\frac{1}{2}$

   b. 3

   c. $\frac{1}{5}$

   d. $\frac{2}{5}$

   e. $\frac{4}{9}$

   f. $-\frac{7}{10}$

7. Determine whether the sign of the exponent x is positive, negative, or zero. Justify your answer.

   $3^x < 1$

1.5 Exponent Laws/Rules

Multiplication Rule	$a^x \cdot a^y = a^{x+y}$
Division Rule	$a^x \div a^y = a^{x-y}$
Power of a Power Rule	$(a^x)^y = a^{xy}$
Power of a Product Rule	$(ab)^x = a^x b^x$
Power of a Fraction Rule	$\left(\frac{a}{b}\right)^x = \frac{a^x}{b^x}$
Zero Exponent	$a^0 = 1$

Example 1: Simplify:

a) $2^3 \cdot 2^5$

b) $(x^3y^2)(x^2y^4)$

c) $\frac{(1.4^3)(1.4^4)}{1.4^2}$

d) $\frac{10a^5b^3}{2a^2b^2}$

e) $\frac{6x^4y^3z}{14xy^2}$

To SIMPLIFY $(ab)^m$ or $\left(\frac{a}{b}\right)^m$

_____

_____. *That is* $(ab)^m = a^m b^m$ *and* $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$

*****Remember to follow BEDMAS*****

Example 2: Simplify.

a) $(2a^5b^3)^4$

b) $\left(\frac{y^4}{x^2}\right)^5$

c) $\left(\frac{3x^3y}{4}\right)^3$

d) $\left(\frac{100r^5}{25r^2b^3}\right)^2$

e) $\left(\frac{78^{12}}{2y^2z^3}\right)^0$

HW: 1.5 WS

1.5 WS

1. Write each expression as a single power with positive exponents.

   a) $2^4 \cdot 2^3$

   b) $0.25^{-2} \cdot 0.25^4$

   c) $5^4 \div 5^6$

   d) $0.5^3 \div 0.5^{-3}$

   e) $(2^3)^2$

   f) $2.5^3 \div 2.5^4$

2. Simplify each expression.

   a) $(x^5)^2$

   b) $5(x^4)^{-2}$

   c) $(x^{-3})^5$

   d) $(x^{-4})^{-5}$

   e)

3. Simplify each expression.

   a) $(2ab)^3(a^2b)^2$

   b) $3(a^{-5}b^{-4})^2(a^2b^3)^4$

   c) $\dfrac{-6(a^3b^2)^{-1}}{(a^2b^5)^{-3}}$

   d) $\dfrac{2(ab^2)^{-2}}{(a^3b)^2}$

4. Simplify each expression.

   a) $\dfrac{4a^{-\frac{4}{5}}b^3}{a^{-2}b^{\frac{3}{2}}}$

   b) $\dfrac{4a^{-2}b^{\frac{3}{2}}}{a^{-4}b^{\frac{1}{2}}}$

   c) $\left(\dfrac{a^{\frac{3}{4}}b^{-2}}{a^{-1}b^{\frac{5}{2}}}\right)^2$

   d) $\left(4a^{-\frac{4}{5}}b^{\frac{1}{10}}\right)^{\frac{5}{2}}\left(a^{\frac{1}{3}}b^{\frac{1}{4}}\right)^3$

5. A strain of bacteria doubles every 20 minutes. The number of bacteria at any time in the past, I, can be approximated using the formula $I = A(2)^{-\frac{n}{20}}$, where A is the current number of bacteria, and n is the time, in minutes that has passed. If there are currently 1 billion bacteria in a colony, approximately how many bacteria were there 8 hours ago (to the nearest whole number).

6. Evaluate the expression for $a = -1$ and $b = -3$. Write the answer as an integer or a fraction.

$$\left(\frac{a^{-3}b}{ab^{-1}}\right)^{-2} \cdot \left(\frac{ab^2}{a^2b^{-1}}\right)^2$$

7. Simplify each expression.

   a) $\left(\dfrac{18x^3y^{\frac{1}{4}}}{8xy^{-\frac{7}{4}}}\right)^{-\frac{1}{3}}$

   b) $\left(\dfrac{6x^{\frac{3}{4}}y^{-2}}{4x^{-\frac{1}{4}}y^{-3}}\right)^{-1} \cdot \left(\dfrac{2x^3y}{3xy^{\frac{1}{2}}}\right)^2$

Review Unit 1

Multiple Choice: *Identify the choice that best completes the statement or answers the question.*

____ 1. Without evaluating the radical, between which two integers is the value of $\sqrt{90}$?

a. 8 and 9 b. 7 and 8 c. 10 and 11 d. 9 and 10

____ 2. Estimate the value of $\sqrt[3]{43}$ to 1 decimal place.

a. 3.7 b. 3.8 c. 3.2 d. 3.5

____ 3. Which value is the closest estimate to $\sqrt[4]{32}$?

a. 2.4 b. 2.6 c. 2.1 d. 2.7

____ 4. Write $\frac{4}{9}$ as a square root.

a. $\sqrt[3]{\frac{64}{729}}$ b. $\sqrt{\frac{16}{18}}$ c. $\sqrt{\frac{8}{81}}$ d. $\sqrt{\frac{16}{81}}$

____ 5. Evaluate $\sqrt[3]{\frac{32}{500}}$. Write the answer as a fraction in lowest terms.

a. $\frac{6}{1}$ b. $\frac{5}{2}$ c. $\frac{2}{5}$ d. $\frac{2}{6}$

____ 6. Which radicals are equal to $\frac{1}{4}$?

I. $\sqrt{\frac{1}{16}}$ II. $\sqrt{\frac{4}{64}}$ III. $\sqrt[3]{\frac{1}{64}}$ IV. $\sqrt[3]{\frac{1}{16}}$

a. Only II and III
b. Only I, II, and III
c. Only I and IV
d. Only I and III

____ 7. Which statements are true?

I. All natural numbers and whole numbers are integers.
II. All positive numbers and negative numbers are integers.
III. All terminating decimals and non-terminating decimals are rational numbers.
IV. All rational numbers and irrational numbers are real numbers.

a. Only statements I, II, and III
b. Only statements I and IV
c. Only statements II and III
d. Only statements I, III, and IV

____ 8. Classify the number $\sqrt{\frac{16}{4}}$.

I. Positive integer II. Rational number III. Irrational number IV. Real number

a. I, II, and IV b. III and IV c. II and IV d. I and II

____ 9. Which set of numbers contains all irrational numbers?

a. $\pi, \sqrt[3]{4}, -0.\overline{6}$

b. $-0.111111\ldots, \sqrt{11}, \sqrt{\frac{2}{9}}$

c. $-2, \sqrt{0.04}, 1.979797\ldots$

d. $\sqrt{2}, -\sqrt[3]{121}, -3.316625\ldots$

____ 10. Write $\sqrt[3]{80}$ as a mixed radical.

a. $8\sqrt[3]{10}$ b. $4\sqrt[3]{5}$ c. $2\sqrt[3]{10}$ d. $10\sqrt[3]{2}$

____ 11. Write $\sqrt[4]{162}$ as a mixed radical.

a. $2\sqrt[4]{3}$ b. $3\sqrt[4]{2}$ c. $3\sqrt{2}$ d. $\sqrt[4]{567}$

____ 12. Write $10\sqrt{3}$ as an entire radical.

a. $\sqrt{30}$ b. $\sqrt{90}$ c. $\sqrt{300}$ d. $\sqrt{900}$

____ 13. Write $3\sqrt[3]{11}$ as an entire radical.

a. $\sqrt[3]{297}$ b. $\sqrt[3]{3993}$ c. $\sqrt[3]{99}$ d. $\sqrt[3]{1089}$

____ 14. Simplify: $3^{\frac{1}{2}} \cdot 3^{\frac{1}{2}}$

a. $3^{\frac{1}{4}}$ b. 3 c. 1 d. $\sqrt{3}$

____ 15. Which expression is equivalent to $\left(\frac{9}{25}\right)^{\frac{3}{2}}$?

a. $\sqrt{\left(\frac{3}{5}\right)^3}$ b. $\sqrt{\left(\frac{9}{25}\right)^3}$ c. $\sqrt[3]{\left(\frac{9}{25}\right)^2}$ d. $\left(\frac{3}{5}\right)^{1.5}$

____ 16. Which power is equivalent to $\left(\sqrt[7]{-125}\right)^4$?

a. $-125^{\frac{4}{7}}$ b. $(-125)^{\frac{7}{4}}$ c. $(-125)^{\frac{4}{7}}$ d. $-125^{\frac{7}{4}}$

____ 17. Evaluate $\left(\frac{125}{64}\right)^{\frac{1}{3}}$ without using a calculator.

a. $\frac{5}{16}$ b. $\frac{5}{4}$ c. $\frac{4}{5}$ d. $-\frac{25}{4}$

____ 18. Write $3\sqrt[3]{2}$ as a power with a rational exponent.

a. $18^{\frac{3}{3}}$ b. $18^{\frac{1}{3}}$ c. $54^{\frac{3}{3}}$ d. $54^{\frac{1}{3}}$

____ 19. Evaluate $-32^{0.6}$ without using a calculator.

a. -8 b. -16 c. 16 d. 8

____ 20. Write $\frac{343}{64}$ as a power with a negative exponent.

a. $\left(\frac{4}{7}\right)^{-2}$ b. $\left(\frac{4}{7}\right)^{-3}$ c. $\left(\frac{7}{4}\right)^{-2}$ d. $\left(\frac{7}{4}\right)^{-3}$

____ 21. Evaluate $-100^{-2.5}$ without using a calculator.

a. $\frac{1}{10\,000}$ b. $-\frac{1}{100\,000}$ c. $\frac{1}{100\,000}$ d. $-\frac{1}{10\,000}$

____ 22. Evaluate $\left(-\frac{1000}{27}\right)^{-\frac{2}{3}}$ without using a calculator.

a. $-\frac{9}{100}$ b. $\frac{9}{100}$ c. $-\frac{10}{3}$ d. $\frac{3}{100}$

____ 23. Simplify $4x^{-6} \cdot 2x^{3}$. Write the expression with positive exponents.

a. $\frac{x^3}{64}$ b. $\frac{8}{x^3}$ c. $\frac{64}{x^3}$ d. $-\frac{x^3}{8}$

____ 24. Simplify $\frac{4x^3}{5x^{-5}}$. Write the expression with positive exponents.

a. $\frac{4}{5x^2}$ b. $\frac{4}{5}x^8$ c. $\frac{4}{5}x^2$ d. $-\frac{5x^8}{4}$

____ 25. Evaluate $\left(\frac{9^{\frac{5}{8}}}{9^{\frac{1}{8}} \cdot 9^{\frac{1}{4}}}\right)^{8}$. Write the answer as an integer or a fraction in lowest terms.

a. $\frac{81}{5}$ b. $-\frac{1}{81}$ c. 81 d. $\frac{1}{81}$

____ 26. Simplify $\left(\frac{5}{2}a^{-2}b^{6}\right)^{-3}$. Write the expression with positive exponents.

a. $\frac{125a^{6}}{8b^{18}}$ b. $\frac{8b^{3}}{125a^{5}}$ c. $\frac{125b^{18}}{8a^{6}}$ d. $\frac{8a^{6}}{125b^{18}}$

____ 27. Simplify $\frac{18a^{6}b^{-9}}{30a^{\frac{1}{2}}b^{8}}$. Write the expression with positive exponents.

a. $\frac{a^{\frac{5}{2}}}{12b^{17}}$ b. $\frac{3a^{\frac{11}{2}}}{5b^{17}}$ c. $\frac{3a^{\frac{5}{2}}}{5b^{17}}$ d. $\frac{3a^{11}}{5b}$

____ 28. Simplify $\frac{\left(x^{6}y^{-3}\right)^{-1}}{-3\left(x^{-5}y\right)^{4}}$. Write the expression with positive exponents.

a. $-\frac{x^{26}}{3y^{7}}$ b. $\frac{3x^{14}}{y^{7}}$ c. $-\frac{x^{14}}{3y}$ d. $-\frac{3x^{26}}{y}$

Unit 1 Review: Answer Section

1. ANS: D
2. ANS: D
3. ANS: A
4. ANS: D
5. ANS: C
6. ANS: B
7. ANS: B
8. ANS: A
9. ANS: D
10. ANS: C
11. ANS: B
12. ANS: C
13. ANS: A
14. ANS: B
15. ANS: B
16. ANS: C
17. ANS: B
18. ANS: D
19. ANS: A
20. ANS: B
21. ANS: B
22. ANS: B
23. ANS: B
24. ANS: B
25. ANS: C
26. ANS: D
27. ANS: C
28. ANS: C