

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Review: Number Systems, Squares, Cubes & Roots

Period: \_\_\_\_\_

### Number Systems

**Real:** Rational and Irrational

**Rational:** Can be expressed as a fraction or ratio, includes fractions, repeating decimals, terminating decimals, perfect square roots, integers.

**Irrational:** Non-terminating, non-repeating, includes non-perfect square roots, &  $\pi$ .

**Integers:** Whole numbers and their opposites, (...-3, -2, -1, 0, 1, 2, 3, 4...).

**Whole numbers:** Natural (Counting) numbers and zero, (0, 1, 2, 3, 4...).

**Natural numbers:** (1, 2, 3, 4, ...) "It is very **natural** to begin **counting** with the number 1!"

*Identify each of the following as either rational or irrational using "R" or "I".*

1) 5.2 \_\_\_\_\_

4)  $\frac{3}{5}$  \_\_\_\_\_

2)  $\sqrt{12}$  \_\_\_\_\_

5)  $-\sqrt{8}$  \_\_\_\_\_

3)  $\pi$  \_\_\_\_\_

6) Are all integers whole numbers? \_\_\_\_\_

7) Are all natural numbers rational numbers? \_\_\_\_\_

The sets below contain which type of numbers:

8) {... -2, -1, 0, 1, 2 .....} \_\_\_\_\_

9) { 1, 2, 3, ...} \_\_\_\_\_

10)  $\{\sqrt{60}, \pi, .101001000 \dots, \dots\}$  \_\_\_\_\_

- 11) Place each of the following numbers in proper order on the number line. Be sure to label the number line appropriately.

$$\frac{8}{3}, \quad -\sqrt{4}, \quad -3, \quad \sqrt{22}, \quad 4.5$$



- 12) Order the following numbers from **greatest to least**. (use of number line is optional)

$$-\frac{5}{3}, \quad \sqrt{49}, \quad 2\pi, \quad \overline{.222}, \quad -2.5$$

- 13) Convert each of the following repeating decimals into a fraction in simplest form.

Let  $x = 0.\overline{6}$  or  $0.666\dots$

The number  $0.\overline{6}$  has 1 repeating digit, so multiply each side by  $10^1$ . (2 repeating x by  $10^2$ )

$$10x = 6.666\dots$$

$$\underline{x = 0.666\dots}$$

Subtract the original **Let equation**

$$9x = 6$$

Solve for x and simplify.

$$x = \frac{6}{9} = \frac{2}{3}$$

TaDa!!!

a)  $x = 0.\overline{5}$

b)  $x = 0.\overline{18}$

## Squares, Cubes and Roots

14) If  $n^2 = 900$ , what is a possible value of  $n$ ?

- a) 30                      b) 300                      c) 450                      d) 81,000

15) If  $x^3 = 1,000$ , what is the value of  $x$ ?

- a) 10                      b) 32                      c) 100                      d) 333

16) What is the square of 9?

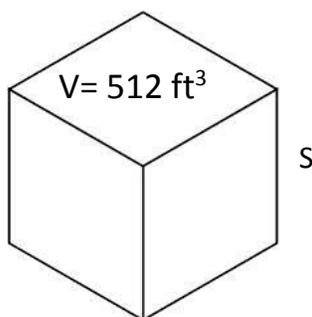
- a) 3                      b) 18                      c) 81                      d) 729

17) The cube of 6 is:

- a) 3                      b) 18                      c) 36                      d) 216

18) Heather has a cube that has a **volume** of 512 cubic feet. Find the length of each side of the cube.

$$V = s^3$$



Length of one side: \_\_\_\_\_

19) A square has an area of 169 square inches. What is the length of each side of the square?

20) The formula for the surface area of a cube is  $SA = 6s^2$ , where  $s$  is the length of a side of the cube. What is the length of the side of a cube with a surface area of  $1.5 \text{ ft}^2$ ?

21) A circle has an area of  $\frac{9}{25}\pi$ . What is the length of the radius of the circle?

22) A cube has a volume of  $\frac{216}{343}$  cubic inches. What is the length of each side of the cube? (leave answer in fractional form.)

23) Which of the following expressions has a value of 4?

a)  $\sqrt{(2^2)}$

b)  $\sqrt{(4^2)}$

c)  $\sqrt{(8^2)}$

d)  $\sqrt{(16^2)}$

24) If  $n = 9$ , what is the value of the expression below?

$$(\sqrt{n})(\sqrt{n})(\sqrt{n})(\sqrt{n})$$

a)  $9^4$

b)  $9^3$

c)  $9^2$

d)  $9^1$

25) Review: Rounding.

a) Round to the nearest thousandths:  $7.67209$  \_\_\_\_\_

b) Round to the nearest whole number:  $325.825$  \_\_\_\_\_

## Exponents

<u>Multiplying Powers</u>	<u>Dividing Powers</u>
<ul style="list-style-type: none"><li>• Multiply coefficients</li><li>• Write (keep) the base</li><li>• Add the exponents</li></ul>	<ul style="list-style-type: none"><li>• Divide coefficients</li><li>• Write (keep) the base</li><li>• Subtract the exponents</li><li>• Convert negative exponents to positive</li></ul>

**Evaluate each power to a single number.**

17) $5^3$	18) $12^0$	19) $8^2$
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**Write each expression using a single *positive* exponent (where applicable).**

20) $\frac{x^4}{x^3}$	21) $4^8 \div 4^2$	22) $\frac{5^5}{5^8}$
23) $8y^{12} \div 2y^{10}$	24) $2 \times 2^4$	
25) $a^6 \times a^8$	26) $3^{-2} \times 3 \times 3^6$	
27) $7b^6 \times 3b$	28) $c^{-4}$	

**Round each number to the nearest whole number, tenths and hundredths place.**

	Whole #	Tenths	Hundredths
29) 8.976			
30) 41.034			



**Write using a single positive exponent:**

1)  $5a^{-4}$

2)  $\frac{3y^6}{18y^{10}}$