

Exam 1 Review Sheet

Name: _____

Please show all your work to get full credit.

To get full use of the worksheet first identify your tool box. Just like a plumber or an electrician that carry a box of tools, as a mathematician you carry yours in your brain. Most often when on an exam, students may not know which tool to use when. So if you do the exercise below it will help you identify which tool to use. I will list the vocabulary you must become very familiar with and then also learn to get a big picture of how these tools are interconnected and/or dissimilar from each other. You should also learn to identify properties that make solving a problem more efficient.

Vocabulary Connections

Please draw labeled arrows to connect each vocabulary term on the left most column to others that you can form a connection to in the second column. Then list the connection in the you see between them in the third column. The first arrow is done for you....

Terminology to connect	Terminology being connected to	Connections
Base	Radical	1. When we write a radical term in exponential notation the radicand becomes the base. For example, $\sqrt[3]{5} = 5^{1/3}$
Exponent	Index	
Degree of a polynomial in one variable	Leading Coefficient	
Positive whole number exponent	Radicand	
Negative whole number exponent	Reciprocal without changing the sign of the base	
Positive rational exponent (e.g., 2/3)	Imaginary numbers	
Negative rational exponent (e.g., -2/3)	Addition	
Like terms	Highest Degree of a term in a polynomial	

For all the problems you do for the review, please note the first step you used to do the problem. Write the first step spelled out in the English language and then see which problems have similar starting step. Then write the step in the first column and in the second column write all the problems that have a similar starting step. This will group all problems with the similar starting step together so you start to recognize these connections. At the end of the review, please fill out this chart. We have started you off on one of the examples as a sample.

1. Fill in the blanks below so that each statement is a true statement.

- In the expression $\sqrt[4]{16}$, 4 is called _____ and 16 is called _____.
- In the polynomial $5x^6 - 7x^4 + 3.5x^3 - \sqrt{2}x - \frac{17}{3}$, 6 is the _____ of the polynomial, 5 is the _____, and $-\frac{17}{3}$ is called the _____.
- For real numbers a and b , $a + b = b + a$ is due to the _____ of addition.
- For real numbers a and b , $a(b + c) = ab + ac$ is due to the _____ property.

For the parts e-j assume all variables are positive real numbers.

e.

$$\boxed{}^{\boxed{}} \times \boxed{}^{\boxed{}} = \left(\frac{1}{4}\right)^9$$

f.

$$\frac{\boxed{}^{\boxed{}}}{a^{12}} = a^4$$

g. $\sqrt{} = 5$

h. $\sqrt[3]{} = a^5$

i.

$$\sqrt[5]{} = x^3 y^2 \sqrt[5]{x^2 y}$$

j.

$$\begin{aligned} & (5x^3 + 2x^2 + 10) \\ & + () \\ & = 12x^3 + 8x^2 + 7x \\ & \quad + 14 \end{aligned}$$

k.
$$\frac{1}{\sqrt[3]{\boxed{}}} = -\frac{2}{b^3}$$

l.
$$\sqrt[3]{\boxed{}} = 3a^5b^2$$

m.
$$\left(\frac{\boxed{}}{\boxed{}}\right)^{-2} = -4$$

2. Answer true or false and justify your answers.

- $\sqrt{x^2 + y^2} = x + y$, where x , and y are positive real numbers.
- $(x + y)^2 = x^2 + y^2$ where x , and y are real numbers.
- $-3^2 = \frac{1}{3^2}$
- $2.\overline{14}$ is an irrational number.

3. Match all the quantities in Column B that are equivalent to quantities in Column A. Some of the column B quantities may not have any corresponding items in column A, but all items in column A have at least one or more corresponding items in column B.

Column A		Column B	
i. -5^{-2}		A. $1 + \frac{3}{4}$	L. $-\frac{16}{3}$
ii. $\sqrt{25}$		B. $\frac{7}{4}$	M. $2^3\sqrt{2}$
iii. $-\frac{1}{4}$		C. -25	N. $-5 + \frac{1}{3}$
iv. $\frac{1}{3^{-2}}$		D. 0.75	O. $-\sqrt{16}$
v. $-\frac{1}{9^{-\frac{1}{2}}}$		E. $-\frac{1}{25}$	P. $\frac{1}{\sqrt{16}}$
vi. $-5\frac{1}{3}$		F. -9	Q. -2^{-4}
vii. $1\frac{3}{4}$		G. -3	R. 2^{-4}
viii. 20%		H. $-\frac{1}{3}$	S. $16^{-\frac{1}{4}}$
ix. $\sqrt[3]{16}$		I. 5	T. 25
		J. 9	U. 1.75
		K. $-5 - \frac{1}{3}$	V. 1.75%


4. Fill the empty columns below and then evaluate the following. Please make sure you do not leave any negative exponents in your answer.

Problem	Base	Exponent	Write in English words how you would read the problem out loud	Expanded form	Evaluate
a. 2^{-3}					
b. $(-3)^{-2}$					
c. -3^{-2}					
d.			Negative of 4 to the second power		
e. $\sqrt{9}$					

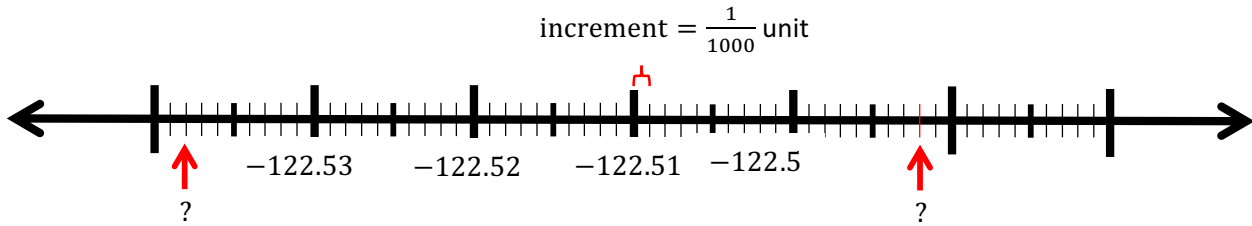
5. Simplify the algebraic expressions below. Assume all variables are positive real numbers. Do not leave any negative exponents in your final answers.

- $(x^2)^3$
- x^3x^5
- $\frac{x^8}{x^3}$
- $(x^3y^{-2})^3(x^{-2})^4$
- $\sqrt{9x^6y^{10}}$
- $\sqrt{12x^5y^8}$

6. Fill in the table below.

Decimal Number	Percentage	Fraction	Fraction in Lowest Terms	Visual Representation
2				
		$\frac{2}{5}$		
				

7. Label the red tick marks below.



8. Plot the numbers in the parts a and b below on a number line so that each number has its own tick mark.

a. $-\frac{4}{5}, \frac{2}{5}, \frac{7}{5}$

b. $-\frac{4\sqrt{3}}{5}, \frac{2\sqrt{3}}{5}, \frac{7\sqrt{3}}{5}$

c. What is the similarity and difference between parts a and b?

9. Perform the following operations where asked, and compare the parts with each other where asked for.

a. $4\frac{2}{5} + 1\frac{4}{5}$

<p>b. $\frac{3}{28} + \frac{5}{28}$</p>	<p>c. $\frac{3}{2x+8} + \frac{5}{2x+8}$</p>
<p>d. What is the similarity and differences between parts b and c?</p>	
<p>e. $(7a + 3b) + (2a + 5b)$</p>	<p>$(7\sqrt{a} + 3\sqrt[3]{b}) + (2\sqrt{a} + 5\sqrt[3]{b})$</p>

f. What is the similarity and differences between parts e and f?

g. $(4x^3 + 6x^2 + 7x + 12) + (5x^6 + 3x^4 + 7x^3 + 10x + 21)$

h. $5\sqrt[3]{2a^5} + 7ab^2\sqrt[5]{b^2} + 8\sqrt[3]{54a^2} + 6\sqrt[5]{b^{12}}$

i. 3.4×4.5	j. $(3x + 4)(4x + 5)$
k. What is the similarity and differences between parts i, and j?	

10. Draw a strip diagram to visually compute 20% of 420.

11. Convert each written description into an algebraic expression. Use appropriate variables when necessary.

a. Rose is four years older than Adam is. Express Rose's age in terms of Adam's age.

b. The price of a car was reduced 12% for an end of year sale. Express the sale price of the car in terms of the regular price P .

Connecting problems from the review with similar first steps.... (add more rows if you need them....

First Step	Problems
<p>1. Making least common denominator before adding fractions.</p>	<p>9a. $4\frac{2}{5} + 1\frac{4}{5}$, 9b. $\frac{3}{28} + \frac{5}{28}$,</p> <p>9c. $\frac{3}{2x+8} + \frac{5}{2x+8}$</p> <p>And the chart in problem number 6</p>
<p>2. Using properties of exponents (if we forget properties of exponents, revert back to the meaning of exponents and write it in expanded form...).</p>	
<p>3. Simplifying radicals using the index to help with the radicand</p>	
<p>4. Adding like terms</p>	