

Practice TEST / STUDY GUIDE

Name: KEY

~~Unit 1 b. Rational numbers test~~

Date: _____

No calculator can be used.

8.EE.2 (2 points each)

1. $\sqrt[3]{216} = 6$
 $6 \times 6 = 36 \times 6 = 216$

similar problems
 $\sqrt[3]{343} = 7$

2. $\sqrt{\frac{81}{100}} = \frac{9}{10}$
 $\frac{\sqrt{81}}{\sqrt{100}}$

$\sqrt{\frac{121}{36}} = \frac{\sqrt{121}}{\sqrt{36}} = \frac{11}{6}$

$7 \times 7 \times 7 = 343$
 $\sqrt[3]{343} = 7$

3. Solve the equation $x^2 = 16$. Show all solutions. Show all work.

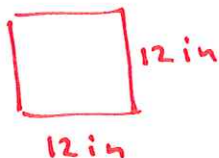
$\sqrt{x^2} = \sqrt{16}$
 $x = 4 \text{ and } -4$
 $4 \times 4 = 16$
 $-4 \times -4 = 16$

all means positive and negative solutions

$x^2 = 36$
 work!!
 $\sqrt{x^2} = \sqrt{36}$
 $x = 6 \text{ and } -6$
 $6 \times 6 = 36$
 $-6 \times -6 = 36$

4. A square picture frame has an area of 144 square inches. Draw and label the square.

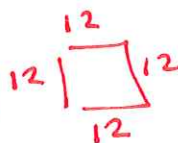
a. What is the length of each side of the picture frame? Show your work or explain your answer including units. (2 points)



$12 \times 12 = 144$
 $\sqrt{144} = 12$

b. Calculate the perimeter of the picture frame including units. (2 points)

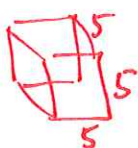
$P = 4s$
 $P = 4 \times 12$
 $12 + 12 + 12 + 12 = 48$
 $P = 48 \text{ inches}$



Similar square picture frame of 169 sq inches

$13 \times 13 = 169$
 $\sqrt{169} = 13$
 $s = 13 \text{ in}$
 Perimeter = 4s
 $4 \times 13 = 52 \text{ inches}$

5. A cube has a volume of 125 cm^3 . What is the length of each edge of the cube? Show or explain how you found your answer. (2 points)



$5 \times 5 \times 5$
 $25 \times 5 = 125$

$V = s \times s \times s$
 or
 $V = s^3$

Similar problem cube with a volume of 64 cm^3

$\sqrt[3]{125} = 5 \text{ cm}$

each edge is 5 cm

$V = 64 \text{ cm}^3$
 $\sqrt[3]{64} = 4 \text{ cm}$
 $4 \times 4 = 16 \times 4 = 64$

6. The mass of Pluto is about 2×10^{17} kilograms. The mass of Mars is about 4×10^{20} kilograms. How many **times** heavier is Mars than Pluto? Write your answer in scientific notation and standard form. (4 points)

$$\frac{\text{MARS}}{\text{Pluto}} = \frac{4 \times 10^{20}}{2 \times 10^{17}} = 2 \times 10^3 \text{ or } 2,000$$

This is a division problem!

$$\frac{4}{2} = 2 \quad 10^{20-17} = 10^3$$

Mars is 2,000 times heavier than Pluto

7. Venus is approximately 72,000,000 miles from the sun. How long does it take light from the sun to reach the earth? Use the speed of light to be 1.8×10^5 miles per second. (4 points)

$$\frac{7.2 \times 10^7}{1.8 \times 10^5} = 4 \times 10^2 \text{ or } 400 \text{ seconds}$$

This is a division problem

$$7.2 \div 1.8 = 72 \div 18 = 4 \quad 10^{7-5} = 10^2$$

8.EE.4 (2 points each) write your answer in standard form and scientific notation

8. $(0.0002)(4 \times 10^7) =$ $2 \times 4 = 8$

$$(2 \times 10^{-4})(4 \times 10^7) \quad 10^{-4+7} = 10^3$$

$$8 \times 10^3 \text{ or } 8000$$

9. $\frac{(3.6 \times 10^6)}{(1.2 \times 10^3)}$ $10^{6-3} = 10^3$

$$\frac{3.6}{1.2} = 3 \quad 3 \times 10^3 \text{ or } 3000$$

10. $(5 \times 10^9) - (8 \times 10^6) =$

$$\begin{array}{r} 5.000 \\ - 0.008 \\ \hline 4.992 \end{array}$$

$$8 \times 10^6 = .008 \times 10^9$$

$$10^{6+3} = 10^9$$

$$4.992 \times 10^9$$

similar

$$(0.00003)(2 \times 10^7)$$

$$(3 \times 10^{-5})(2 \times 10^7)$$

$$6 \times 10^{-5+7}$$

$$6 \times 10^2 = 600$$

$$\frac{5.6 \times 10^9}{1.4 \times 10^3} = 1.4 \overline{)5.6}$$

$$\begin{array}{r} 4 \\ 14 \overline{)56} \\ \underline{56} \\ 0 \end{array}$$

$$4 \times 10^{9-3}$$

$$4 \times 10^6 = 4,000,000$$

$$(3 \times 10^8) - (8 \times 10^7)$$

$$\begin{array}{r} 3.0 \times 10^8 \\ - 0.8 \times 10^8 \\ \hline 2.2 \times 10^8 \end{array}$$

$$.8 \times 10^8$$

$$2.2 \times 10^8$$

11. A factory builds a new warehouse that is approximately 1.28×10^5 square feet. Later, they add on 1.13×10^3 more square feet for offices. Use scientific notation to write the total size of the new building. (4 points)

$$\begin{array}{r}
 1.28 \times 10^5 + 1.13 \times 10^3 \\
 + 0.0113 \\
 \hline
 1.2913
 \end{array}$$

10^{3+2}
 $.0113 \times 10^5$

this is an addition problem

Final answer 1.2913×10^5

12. A small sardine weighs .17 lbs and a sardine company can bring in 200,000,000 sardines per year. Approximate how much weight the company brings in per year. Use scientific notation to help solve this problem. (4 points)

.17 = approx .2 ~~lb~~ pounds rounded

This is an estimated multiplication problem

$$.2 = 2 \times 10^{-1}$$

$$200,000,000 = 2 \times 10^8$$

$$(2 \times 10^{-1})(2 \times 10^8) = 4 \times 10^{-1+8}$$

$$4 \times 10^7 \text{ or } 40,000,000 \text{ lbs}$$

13. EQ: How can I manipulate numbers into different forms and why is it important? (2 points)

- TO PUT NUMBERS INTO THE SAME FORM SO THEY CAN BE COMPARED
- TO MAKE CALCULATIONS WITH LARGE AND SMALL NUMBERS EASIER BY USING SCIENTIFIC NOTATION + EXPONENTS
- TO MAKE CALCULATIONS EASIER BY USING

FRACTIONS

$$.3 \times .5$$

$$.3333 \times .5555 = ?$$

$$\frac{1}{3} \times \frac{5}{9} = \frac{5}{27} \checkmark \rightarrow \text{easier}$$