Name: Key Date: _____ Period: _____

Benchmark 2 Study Guide

I CAN CONVERT FRACTIONS TO THEIR DECIMAL EXPANSION BY DIVIDING.

Fractions are another way of representing division. To convert a fraction to its equivalent decimal expansion, simply divide the numerator (top) by the denominator (bottom).

Example: $\frac{99}{200} =$ .495 **Show your division here:**

$$\begin{array}{r} .495 \\ 200\overline{)99} \\ -0 \\ \hline 990 \\ -800 \\ \hline 1900 \\ -1800 \\ \hline 1000 \\ -1000 \\ \hline 0 \end{array}$$

Sometimes, fractions represent decimals that are non terminating (meaning they don't end). We can still come up with an approximation for the decimal expansion by dividing.

Example: $\frac{11}{37} \approx .\overline{297}$ **Show your division here:**

$$\begin{array}{r} .297 \\ 37\overline{)11} \\ -0 \\ \hline 110 \\ -74 \\ \hline 360 \\ -333 \\ \hline 270 \\ -259 \\ \hline 11 \end{array}$$

* right back where I started = repeating

$.\overline{297}$

I CAN CONVERT TERMINATING AND REPEATING DECIMALS INTO FRACTIONS.

If a decimal is terminating (meaning it ends) we can write it as a fraction by putting it over 10, 100, 1000, 10000, etc. (based on how many decimal places it goes to). If a decimal is repeating (meaning it goes on forever with a pattern) we write it as a fraction by putting it over 9, 99, 999, 9999, etc. (based on how many decimal places it goes to).

Remember to always simplify if possible!

$\frac{216}{1000} \div \frac{2}{2} = \frac{108}{500} \div \frac{2}{2} = \frac{54}{250} \div \frac{2}{2} = \frac{27}{125}$

Examples:

$0.216 = \frac{27}{125}$

$\frac{42}{99} \div \frac{3}{3} = \frac{14}{33}$

$0.\overline{42} = \frac{14}{33}$

Now you try!

1. Convert $\frac{7}{11}$ into a decimal. .63

$$\begin{array}{r} .63 \\ 11\overline{)7} \\ -0 \\ \hline 70 \\ -66 \\ \hline 40 \\ -33 \\ \hline 7 \end{array}$$

* back where I started so it repeats.

2. Convert 0.555 into a fraction. $\frac{111}{200}$

$\frac{555}{1000} = \frac{111}{200}$

3. What is the decimal equivalent to $\frac{11}{40}$? .275

$$\begin{array}{r} .275 \\ 40\overline{)11} \\ -0 \\ \hline 110 \\ -80 \\ \hline 300 \\ -280 \\ \hline 200 \end{array}$$

4. What is the fraction equivalent to $0.\overline{54}$? $\frac{6}{11}$

$\frac{54}{99} = \frac{6}{11}$

I CAN REPRESENT AND COMPARE NUMBERS IN SCIENTIFIC NOTATION.

Scientific notation is a way to write very large and very small numbers in a shorter way. To convert a number into scientific notation, move the decimal until you get a number that is between 1 and 10. Then write that number multiplied by some power of ten. The exponent on the ten is equal to the number of places you moved the decimal. If the original number was really small then the exponent should be negative. If the original number was really large then the exponent should be positive.

Examples:

$51{,}400{,}000{,}000 =$ 5.14×10^{10} $\quad$ $0.000000000203 =$ 2.03×10^{-10}

To convert a number from scientific notation to standard notation, use the exponent to know how many times to move the decimal. If the exponent is positive, move the decimal so that the number gets bigger. If the exponent is negative, move the decimal so that the number gets smaller.

Examples:

$1.4 \times 10^{-6} =$ 0.0000014 $\quad$ $3.75 \times 10^{5} =$ 375,000

To compare numbers in scientific notation, convert them both into standard form and compare.

Example:

Canada has a population of 3.5×10^7 people. The United States has a population of 3.18×10^8 people. Which country's population is larger? US = 318,000,000 – larger

Canada = 35,000,000

Now you try!

1. Write 225,120,000 in scientific notation. 2.2512×10^8 225,120,000
2. Write 0.00000807 in scientific notation. 8.07×10^{-6} .00000807
3. Write 1.99×10^{-2} in standard form. .0199 .0199
4. Write 6.45×10^{6} in standard form. 6,450,000 6.450000.
5. Neptune is 4.5 billion kilometers from the sun. Represent this number in scientific notation.
   4.5×10^9 4.5 billion = 4,500,000,000
6. Compare using < or >.
   1.5×10^5 > 9.98×10^4
   ↓ ↓
   1.50000 9.9800
   150,000 99800
7. Circle the smallest number.
   (8.5 × 10⁻³) 2.02 × 10⁻²
   ↓
   .0085 .0202