**UNIT 3: Decimals**

***TOPICS:***

* *REVIEW A – Estimating Decimal Addition and Subtraction*
* *REVIEW B – Writing Decimals as Fractions and Percentages*
* *3.2 Adding and Subtracting Decimals*
* *3.3 Multiplying by Numbers Less than 1*
* *3.4 Multiplying by Numbers Greater than 1*
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* *3.8 Using Order of Operations with Decimals*
* *3.9 Expressing Fractions as Decimals*
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***REVIEW A – Estimating Decimal Addition and Subtraction***

* All decimal estimations should be done mentally.
* Largest place value 🡪 0.382 (3 is in the largest place value)

🡪 94.68 (9 is in the largest place value)

Ex. 1) All numbers have the same largest place value. Round both numbers to the largest place value.

1. 45.8 + 31.3 🡪 50 + 30 = 80 b.) 0.429 – 0.178 🡪 0.4 – 0.2 = 0.2
2. 0.0421 + 0.082 + 0.0919 🡪 0.04 + 0.08 + 0.09 = 0.21

Ex. 2) They have different largest place values. If off by factor of 10, round both numbers to the largest place value of the smaller number.

1. 937.17 + 49.6 🡪 940 + 50 = 990 b.) 0.487 – 0.0734 🡪 0.49 – 0.07 = 0.42

c.) 56.09 + 32.85 🡪 d.) 0.393 + 0.089 🡪

1. 0.0579 – 0.0128 🡪 f.) 4.299 – 0.894 🡪

ASSIGNMENT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***REVIEW B – Writing Decimals as Fractions and Percentages***



Ex. 1) Write each decimal as a fraction in lowest terms.

1. 0.08 = b.) 2.4 =

c.) 3.12 = d.) 1.098 =

Ex. 2) Write each decimal as a percentage.

1. 0.35 = b.) 0.09 = c.) 0.035 =
2. 1.2 = e.) 3.62 = f.) 0.009 =

ASSIGNMENT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. ***Adding and Subtracting Decimals***

Ex. 1) Estimate, then evaluate

1. 5.612 + 0.629 = b.) 0.928 – 0.29 =

c.) 329.29 + 52.09 = d.) 5 – 0.39 =

1. 0.8 – 0.685 = f.) 3.52 + 0.903 + 1.05 =

ASSIGNMENT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***3.3 Multiplying by Numbers Less than 1***

* When multiplying by a number greater than 1, then product will be larger than the multiplicand. (ex. 6 x 3.1 = 18.6)
* When multiplying by a number less than 1, then product will be smaller than the multiplicand. (ex. 12 x 0.5 = 6)

***6 (multiplicand) x 4 (multiplier) = 24 (product)***

Ex. 1) Calculate the following using a 10 x 10 grid.

1. 0.4 x 0.8 = b.) 0.5 x 0.9 = c.) 0.2 x 0.3 =

Ex. 2) Calculate vertically.

1. 8 x 0.8 = b.) 9.4 x 0.8 = c.) 10.4 x 0.7 =

ASSIGNMENT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***3.4 Multiplying by Numbers Greater than 1***

Ex. 1) Model each of the following products using base 10 blocks.

1. 1.2 x 1.3 = b.) 2.1 x 1.4 =

Ex. 2) Estimate, then calculate.

1. 3.24 x 2.5 = b.) 12.4 x 8.7 = c.) 9.17 x 1.5 =

Ex. 3) Beef sells for $15.83 per 1 kg. How much does 3.5 kg cost?

Ex. 4) Tom worked 8 hours at $23.50 per hour. Jill worked 5.5 hours at $35 per hour. Who made more?

ASSIGNMENT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***3.6 Dividing by Numbers Less than 1***

* When dividing by a number greater than 1, then **quotient** will be smaller than the **dividend**. (ex. 6 ÷ 2 = 3)
* When dividing by a number less than 1, then the **quotient** will be larger than the **dividend**. (ex. 12 ÷ 0.5 = 24)

***24 (dividend) ÷ 4 (divisor) = 6 (quotient)***

Ex. 1) Use equivalent fractions to show that 3.6 ÷ 0.4 is the same as 36 ÷ 4.

Ex. 2) Use equivalent fractions to show that 5.43 ÷ 0.3 is the same as 54.3 ÷ 3.

Ex. 3) Estimate, then calculate.

1. 2.35 ÷ 0.3 = b.) 4.76 ÷ 0.04 = c.) 34.2 ÷ 1.5 =

Ex. 4) A rectangle has an area of 56.4 cm2. One side of the rectangle is 6 cm, what is the length of the other side?

ASSIGNMENT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***3.7 Dividing by Numbers Greater than 1***

Ex. 1) Use equivalent fractions to show that 7.8 ÷ 1.3 is the same as 78 ÷ 13.

Ex. 2) Use equivalent fractions to show that 86.4 ÷ 2.4 is the same as 864 ÷ 24.

Ex. 3) Estimate to complete the inequality.

1. 8.4 ÷ 2.4 \_\_\_\_ 20.4 ÷ 3.4 b.) 10.5 ÷ 1.5 \_\_\_\_ 102.5 ÷ 20.5

Ex. 4) Estimate, then calculate.

1. 6.5 ÷ 1.5 = b.) 9.36 ÷ 0.36 = c.) 9.72 ÷ 4.5 =

Ex. 5) Tommy made $307.80 for 9.5 hours of work. Jill made $265.50 for 7.5 hours of work. Who made the most per hour?

ASSIGNMENT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***3.8 Using Order of Operations with Decimals***

**RULES FOR ORDER OF OPERATIONS:**

* Do the **brackets first**. Apply correct order within brackets as well. (B)
* Do **exponents** second. (E)
* Do **division and multiplication** next in order from left to right. (DM)
* Do **addition and subtracting** last in order from left to right. (AS)

Ex. 1) What is the correct answer? (circle)

1. 3 + 4 x 5 = 35 *or* 3 + 4 x 5 = 23 b.) 4 x 3 – 2 x 3 = 30 *or* 4 x 3 – 2 x 3 = 6

Ex. 2) Enter in the operations (x, ÷, -, +, () ) to make each statement true.

1. 8 \_\_\_ 5 \_\_\_ 4 \_\_\_\_ 2 = 18 b.) 9 \_\_\_ 3 \_\_\_ 8 \_\_\_ 3 = 30

Ex. 3) Evaluate. **Calculator allowed**.

1. (5.4 + 2.3) x 4 b.) 8.4 ÷ 4 x 2.1 + 0.5 x 4 c.) 6.9 + 5 ÷ 5 – 3 x 1.2

Ex. 4) Express each statement with a mathematical equation.

1. Johnny worked 8.5 hours on Thursday, then 3.5 hours on Friday. He makes $15 per hour. How much did he make in total?
2. Jill bought 22 bags of concrete for a job that cost $7.80 each. She only used 16 so she then sold the leftovers to a friend for $5.50 each. How much did she spend in total?

ASSIGNMENT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***3.9 Expressing Fractions as Decimals***

**Rational Numbers** – Can be written as a fraction in the form $\frac{A}{B}$ and can be either a repeating decimal or a terminating decimal.

**Repeating decimals** – A repeating decimal can be represented either with … or using bar notation.

Ex. 1) 1 ÷ 3 = 0.3333333 … or 0.3

Ex. 2) $\frac{17}{99} =$ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Terminating decimals** stop after a certain number of digits.

Ex. 3) 0.3, 0.45, 2.125 are all terminating decimals.

Ex. 4) Write using bar notation.

1. 0.913913913913 … = \_\_\_\_\_\_\_\_\_\_ b.) 3.2821111111… = \_\_\_\_\_\_\_\_\_\_\_

Ex. 5) Write each fraction as an equivalent fraction over 10, 100, or 1000, then write as a decimal.

1. $\frac{3}{4}=\frac{}{100}=\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$ b.) $\frac{11}{20}=\frac{}{100}=\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$ c.) $1\frac{4}{5}=1\frac{}{10}=\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$

Ex. 6) Write each fraction as a decimal using your calculator. Use bar notation when required.

1. $\frac{3}{8}=\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$ b.) $\frac{12}{33}=\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$ c.) $2\frac{7}{30}=\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$

Ex. 7) Predict the decimal equivalent using the fact that $\frac{1}{4}=0.25$

1. $\frac{1}{40}=\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$ b.) $\frac{1}{8}=\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$ c.) $\frac{1}{400}=\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_$

ASSIGNMENT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***3.10 Expressing Decimals as Fractions***

I can convert decimals to fractions using two methods.

**Comparing Fractions**

Using the fact that $\frac{1}{9}=0.1111...$ $\frac{1}{99}=0.0101...$ $\frac{1}{999}=0.001001001...$

 $\frac{1}{10 }= 0.1$ $\frac{1}{100}=0.01$ $\frac{1}{1000}=0.001$

Ex. 1) Write the following as a decimal.

1. 0.27 = \_\_\_\_\_\_\_\_\_\_ b.) 0.082 = \_\_\_\_\_\_\_\_\_ c.) 2.8 = \_\_\_\_\_\_\_\_\_\_
2. 0.222…. = e.) 0.8787… = f.) 3.0404… =

**Algebraic Solution (Extending)**

Ex. 2) Write the following as a decimal.

1. 0.2222… b.) 1.313131…

ASSIGNMENT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_