| MA 2D | Mathematics Embedded Credit |
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| **Cape Career & Technology Center** | **Last Update: April 2017** |
| **Topic: Fractions, Decimals, Percents** | **Focus: Estimations** |

| Show-Me Standards: MA1, MA5 | MO Grade Level Expectations: N3D12, N3D8 | NCTM Standards: 3B |
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**OBJECTIVE: Students will be capable of estimating values using decimals, fractions and by converting fractions to decimals, or decimals to fractions.**

**Introduction:**
In **REVIEW**, there are specific rules of fractions that must be followed in the process of estimating with fractions. The following table is a summary of those rules.

| OPERATION | STEP A | STEP B | STEP C | STEP D |
|---|---|---|---|---|
| **ADDITION** | *FIND A COMMON DENOMINATOR* | *ADD THE NUMERATORS, KEEP THE COMMON DENOMINATOR* | *PROCEED TO NEXT STEP* | *REDUCE TO LOWEST TERMS* |
| **SUBTRACTION** | *FIND A COMMON DENOMINATOR* | *SUBTRACT THE NUMERATORS, KEEP THE COMMON DENOMINATOR* | *PROCEED TO NEXT STEP* | *REDUCE TO LOWEST TERMS* |
| **MULTIPLICATION** | *1ST, CHANGE MIXED NUMBERS TO IMPROPER FRACTIONS* | *PROCEED TO NEXT STEP* | *FACTOR AND CANCEL, MULTIPLY NUMERATORS, MULTIPLY DENOMINATORS* | *REDUCE TO LOWEST TERMS* |
| **DIVISION** | *1ST, CHANGE MIXED NUMBERS TO IMPROPER FRACTIONS* | *INVERT THE DIVISOR, CHANGE OPERATION FROM DIVISION TO MULTIPLICATION* | *FACTOR AND CANCEL, MULTIPLY NUMERATORS, MULTIPLY DENOMINATORS* | *REDUCE TO LOWEST TERMS* |

Keeping this chart in mind will help with the process of getting your equations to move forward to a solution.

The process of estimation includes the need to switch fractions to decimals and decimals to fractions. The following tables describe the steps necessary for completing a switch between fractions and decimals.

| DECIMALS TO FRACTIONS |
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**STEP1:** The numbers left of the decimal are whole numbers and should be written in the spot filled by the A in the example: $A\dfrac{b}{c}$.

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**STEP2:** The numbers to the right of the decimal are the numerator and should include all digits (except when the digit is a repeating zero [0]).

**EXAMPLE:** 2.005500 – the whole number is 2, the numerator is 55 and the denominator is C - $2\dfrac{55}{C}$.

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**STEP 3:** Make the denominator of the fraction equal to the place value of the least significant figure (on the far right). There will be as many zeroes as there are decimal places that contain a significant figure.

**EXAMPLE:** 2.005500 – the whole number is 2, the numerator is 55 (only the significant figures are utilized), and the denominator is 10,000 - $2\dfrac{55}{10000}$.

**NOTE:** the last two zeroes (0), after the seven (7) are not included in the fraction because they are not significant figures.

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**STEP 4:** Reduce the fraction to its lowest terms.

**EXAMPLE:** $2\dfrac{55}{10000} = 2\dfrac{11}{2000}$ the final answer (example used throughout the chart).

**OTHER EXAMPLES:** $0.2 = \dfrac{2}{10} = \dfrac{2*1}{2*5} = \dfrac{1}{5}$

$0.25 = \dfrac{25}{100} = \dfrac{25*1}{25*4} = \dfrac{1}{4}$

$0.125 = \dfrac{125}{1000} = \dfrac{125*1}{125*8} = \dfrac{1}{8}$

$$3.1875 = 3\frac{1875}{10000} = 3\frac{625*3}{625*16} = \frac{3}{16}$$

## FRACTIONS TO DECIMALS

**STEP 1:** When present, place the whole number to the left of the decimal point.

**EXAMPLE:** $A\frac{b}{c}$ - A.xxx

**STEP 2:** Divide the numerator by the denominator.

**EXAMPLE:** $2\frac{1}{2} = 2(\frac{1}{2} = 2\overline{)1}) = 2.5$

**STEP 3:** If the numerator does not divide by the denominator exactly, round off to 3 decimal places, unless otherwise specified. **REMEMBER** to round to the third digit.

**EXAMPLES:**
$$\frac{1}{2} = 0.5$$
$$\frac{2}{3} = 0.667$$
$$5\frac{3}{8} = 5.375$$

## PROBLEMS:

**Convert the following decimals to fractions.  Reduce the fractions to lowest terms.**

| 1.  0.6 | 2.  0.25 | 3.  0.035 | 4.  4.004 | 5.  5.375 |
|---------|----------|-----------|-----------|-----------|
| 6.  0.8 | 7.  0.75 | 8.  0.040 | 9.  3.125 | 10.  2.002 |

**Convert the following fractions to decimals.  Round the decimals to 3 significant figures.**

| 1.  $\dfrac{3}{4}$ | 2.  $\dfrac{2}{5}$ | 3.  $3\dfrac{4}{9}$ | 4.  $5\dfrac{9}{16}$ | 5.  $1\dfrac{5}{12}$ |
|---|---|---|---|---|
| 6.  $\dfrac{6}{7}$ | 7.  $\dfrac{5}{8}$ | 8.  $6\dfrac{5}{16}$ | 9.  $1\dfrac{7}{16}$ | 10.  $6\dfrac{7}{10}$ |

## WORD PROBLEMS:

**Solve the following word problems.  Include the unit of measurement with the final answer.**

1.  The blueprints for a building project call for the main carrying beam to be built in 3 sections:  12.3 ft., 45.68 ft. and 13.075 ft.  What is the total length of the beam? (Round the answer to 3 significant figures.)

2.  A crop-duster plane distributes an insecticide at the rate of 14.6 acres per hour.  How many hours will be needed to fully distribute insecticide on a 32-acre field?  (Express your answer as a fraction.)

3.  Which is a better buy for your day care (lowest cost per ounce)?  A 15 oz. bottle of dishwashing fluid for $2.30 or $2.55 for a 20 oz. bottle.

4.  Your automotive service station charges $36 per hour of labor, what would be the labor cost for a job that 'rates-out' at 2.15 hours?

5.  The electric motor of a saw draws 12.3 amps of current when cutting through a 2x4 pine board.  The current drops to 4.8 amps with no load.  How much lower is the current with no load?  (Express your answer as a fraction.)