

LESSON 4: Convert Fractions, Do Order of Operations

Weekly Focus: fractions, decimals, percent, order of operations
Weekly Skill: convert, compute

Lesson Summary: First, students will solve a word problem with measurement of length and equivalent fractions. Then they will review examples of conversion. In Activity 3, they convert between fractions, decimals and percent. In Activity 4, they will compute order of operations. In Activity 5, they will do word problems with order of operations. There are an exit ticket and an extra word problem at the end. Estimated time is two hours.

Materials Needed for Lesson 4:

- Video (length 3:47) on changing fractions to decimals and percent. The video is required for teachers and optional for students.
- 3 Worksheets with answers (attached)
- Exit ticket (attached)

Objectives: Students will be able to:

- Solve word problems with equivalent fractions
- Convert between fractions and decimals and percent
- Calculate order of operations and do word problems

ACES Skills Addressed: N, CT, LS

CCRS Mathematical Practices Addressed: Attend to Precision, Mathematical Fluency

Levels of Knowing Math Addressed: Intuitive, Abstract, Application, and Communication

Teacher Note: Source of statistic for Activity 1 is minnpost.com article of 5/29/12.

Notes:

You can add more examples if you feel students need them before they work. Any ideas that concretely relates to their lives make good examples.

For more practice as a class, feel free to choose some of the easier problems from the worksheets to do together. The “easier” problems are not necessarily at the beginning of each worksheet. Also, you may decide to have students complete only part of the worksheets in class and assign the rest as homework or extra practice.

The GED Math test is 115 minutes long and includes approximately 46 questions. The questions have a focus on quantitative problem solving (45%) and algebraic problem solving (55%).

Students must be able to understand math concepts and apply them to new situations, use logical reasoning to explain their answers, evaluate and further the reasoning of others, represent real world problems algebraically and visually, and manipulate and

Lesson 4: Convert Fractions, Review Order of Operations

solve algebraic expressions.

This computer-based test includes questions that may be multiple-choice, fill-in-the-blank, choose from a drop-down menu, or drag-and-drop the response from one place to another.

The purpose of the GED test is to provide students with the skills necessary to either further their education or be ready for the demands of today's careers.

Lesson 4 Warm-up: Solve the Measurement Problem

Time: 10 Minutes

Write on the board: Sandy and Rafael's children have an annual checkup with their doctor. The parents need to measure their children's heights prior to filling out the required forms. Here are their heights in inches: Margarita is 18 inches tall, Ana is 30 inches tall, Pablo is 50 inches tall, and Miguel is 64 inches tall.

Basic Questions:

Convert each child's height from inches to feet and inches.

(Margarita is 1 ft. 6 in., Ana is 2 ft. 6 in., Pablo is 4 ft. 2 in., Miguel is 5 ft. 4 in.)

Extension Questions:

Convert the children's heights to feet and fractions of a foot. Reduce. Do Margarita together as example: 1 ft. 6 in. = 1 ft. and $\frac{6}{12}$ in. = $1 \frac{1}{2}$ ft.

(Ana is $2 \frac{1}{2}$ feet tall, Pablo is $4 \frac{1}{6}$ feet tall, and Miguel is $5 \frac{1}{3}$ feet tall.)

Lesson 4 Activity 1: Examples of Converting Fractions to Decimals to Percent

Time: 10-15 Minutes

Example A: During a typical 8-hour workday, you spend about two hours doing paperwork.

- Write how much time you spend on paperwork as a fraction and reduce ($\frac{2 \text{ hours}}{8 \text{ hours}} = \frac{1}{4}$).
- How do you convert the fraction to a decimal? (You can divide 2 by 8 and get 0.25 or you can divide 1 by 4 and also get 0.25.) Ask the students why both of these yield the same answer (because they are equivalent fractions).
- You can also write equivalent fractions. $\frac{1}{4} = \frac{25}{100}$

Lesson 4: Convert Fractions, Review Order of Operations

Sometimes it is easier to do equivalent fractions. Other times it is easier to do long division. Long division always works.

- What is 0.25 as a percent? (25%) Why? $0.25 = 25/100 = 25\%$

Example B: Tell the students or write on the board: On average, women earn 30 cents less on the dollar than men do.

- So how much do women earn then compared to men? (Women earn 70 cents for every dollar a man makes.)
- Write this as a fraction (70/100 because both the numerator and denominator need to be in the same format, both need to be cents).
- Write this as a decimal. Some students will know that it's \$0.70. But what if you don't know or it's not an easy number to convert? You can divide $70 \div 100$ or you can reduce the 70/100 to 7/10 first and then divide.
- What if you started with \$0.70 and had to convert that to a fraction? What would you do? Students should say to $0.70 = 70/100 = 7/10$.

Spend time discussing and doing all of these on the board.

Lesson 4 Activity 2: More Examples of Converting Decimals to Percent

Time: 10 Minutes

Example A: Using the same example above, how do you convert \$0.70 to a percent and why? $0.70 = 70/100 = 70\%$. By definition, % is the same as the number over 100. Another way is moving the decimal point over to the right two spaces and then add the % sign.

Example B: Convert 1.05 to a percent. Since $1.05 = 1$ and $5/100$, then answer is 105%. Also, you can move the decimal point over twice. If students are confused that it is more than 100%, show them a sheet of paper and ask them what percent of the paper you have (100%), so if you add a little more from another sheet of paper, you have more than 100%.

Example C: Convert 0.002 to a percent. You move the decimal point over to the right twice and get 0.2%. That is 2/10 of one percent.

Lesson 4 Activity 3: Practice Converting Fractions, Decimals, Percent

Time: 25 Minutes

Do Worksheet 4.1 (attached). Choose a few of the more challenging problems and have students volunteer to do them on the board.

Lesson 4.1 Worksheet: Fractions, Decimals, and Percent

Write each as a decimal. Round to the thousandths place.

1) 90%

2) 30%

3) 115.9%

4) 9%

5) 7%

6) 65%

7) 0.3%

8) 445%

Write each as a percent. Round to the nearest tenth of a percent.

9) 0.452

10) 0.006

11) 0.002

12) 0.05

13) 4.78

14) 0.1

15) 3.63

16) 0.03

Write each as a fraction.

17) 25%

18) 50%

19) 93%

20) 20%

Lesson 4.1 Worksheet Answers

- | | |
|----------|----------------------|
| 1) 0.9 | 11) 0.2% |
| 2) 0.3 | 12) 5% |
| 3) 1.159 | 13) 478% |
| 4) 0.09 | 14) 10% |
| 5) 0.07 | 15) 363% |
| 6) 0.65 | 16) 3% |
| 7) 0.003 | 17) $\frac{1}{4}$ |
| 8) 4.45 | 18) $\frac{1}{2}$ |
| 9) 45.2% | 19) $\frac{93}{100}$ |
| 10) 0.6% | 20) $\frac{1}{5}$ |

Lesson 4 Activity 4: Order of Operations Computation

Time: 25-30 Minutes

When solving equations, the computation must be done in a specific order. Write the following on the board and have the students tell you which ones they do 1st, 2nd, 3rd, 4th:

- Add and subtract left to right
- Parentheses
- Multiply and divide left to right
- Exponents (powers and square roots)

***Answer:** Parentheses, Exponents, Multiplication and Division, Addition and Subtraction. Some students like to remember this with the phrase: "Please Excuse My Dear Aunt Sally". Your students may or may not find this helpful.*

Do **Worksheet 4.2**. Do the first problem together, give students a minute to do the second one, and then have students volunteer to do it on the board. Let students continue individually or with a partner. Circulate to help. Have students volunteer to do more problems on the board.

Teacher Note: It is not necessary to do all the problems if the exercise is easy or if you don't have enough time. Make sure there is enough time to complete the next activity. Also, tell students they will practice exponents and roots in future lessons.

Lesson 4 Activity 5: Order of Operations Word Problems

Time: 15-25 Minutes

Example: Joe buys 2 shirts at \$8.00 each. He also buys a pair of jeans for \$20.00 that gets a \$3.00 discount.

Write an expression in words, then write it in numbers and solve.

2 shirts + jeans – discount = cost

(2 x \$8 shirts) + (\$20 jeans – \$3 discount) = X dollars total cost

(2 x 8) + (20 – 3) = 16 + 17 = \$33

Do **Worksheet 4.3 Order of Operations Word Problems**. Remind students to add parentheses where necessary. Have students volunteer to do answers on the board. For #6 (students' ideas), have volunteers read their problems aloud for other students. Solve together.

Worksheet 4.2: Basic Order of Operations

1) $(34 - 4) \div 6 + 4^2$

6) $(10 \times 5 + 2^2) - 7$

2) $(4 + 5)^2 + (12 \div 4)$

7) $(32 - 2^2) \div (8 - 4)$

3) $6 \times (8 - 4) + 2^2$

8) $2 \times (8 - 3) + 6^2$

4) $(10 + 4)^2 + (18 \div 2)$

9) $(43 - 3) \div 5 - 7^2$

5) $(3 \times 2 + 8^2) + 5$

10) $(41 - 3^2) \div (8 - 6)$

Worksheet 4.2 **Answers**

$$\begin{array}{r}
 1) (34 - 4) \div 6 + 4^2 \\
 30 \div 6 + 4^2 \\
 30 \div 6 + 16 \\
 5 + 16 \\
 21
 \end{array}$$

$$\begin{array}{r}
 6) (10 \times 5 + 2^2) - 7 \\
 (10 \times 5 + 4) - 7 \\
 (50 + 4) - 7 \\
 54 - 7 \\
 47
 \end{array}$$

$$\begin{array}{r}
 2) (4 + 5)^2 + (12 \div 4) \\
 9^2 + 3 \\
 81 + 3 \\
 84
 \end{array}$$

$$\begin{array}{r}
 7) (32 - 2^2) \div (8 - 4) \\
 (32 - 4) \div (8 - 4) \\
 28 \div 4 \\
 7
 \end{array}$$

$$\begin{array}{r}
 3) 6 \times (8 - 4) + 2^2 \\
 6 \times 4 + 2^2 \\
 6 \times 4 + 4 \\
 24 + 4 \\
 28
 \end{array}$$

$$\begin{array}{r}
 8) 2 \times (8 - 3) + 6^2 \\
 2 \times 5 + 6^2 \\
 2 \times 5 + 36 \\
 10 + 36 \\
 46
 \end{array}$$

$$\begin{array}{r}
 4) (10 + 4)^2 + (18 \div 2) \\
 14^2 + 9 \\
 196 + 9 \\
 205
 \end{array}$$

$$\begin{array}{r}
 9) (43 - 3) \div 5 - 7^2 \\
 40 \div 5 - 7^2 \\
 40 \div 5 - 49 \\
 8 - 49 \\
 -41
 \end{array}$$

$$\begin{array}{r}
 5) (3 \times 2 + 8^2) + 5 \\
 (3 \times 2 + 64) + 5 \\
 (6 + 64) + 5 \\
 70 + 5 \\
 75
 \end{array}$$

$$\begin{array}{r}
 10) (41 - 3^2) \div (8 - 6) \\
 (41 - 9) \div (8 - 6) \\
 32 \div 2 \\
 16
 \end{array}$$

Worksheet 4.3 Order of Operations Word Problems

- 1) Chu has a checking account balance of \$325. She writes a check for 2 pairs of socks, each pair priced at \$6.49 including tax. Write an expression that shows her new account balance.
- 2) Mohamed bought a box of nails for \$5.99 and a can of paint for \$39. He received \$5.01 in change. Write an expression that shows how much money he gave the clerk.
- 3) Belinda soldered a pipe measuring 6.8 meters to another measuring 1.5 meters, then divided the new pipe into two equal pieces. Write an expression that shows the length of each new pipe.
- 4) It takes most assembly workers 4 minutes to wrap a box. Write an expression that shows how many boxes 2 workers can wrap in 60 minutes.
- 5) Dani bought 3 hamburgers at \$4.99 each and 2 sodas at \$1.25 each. He paid with a \$20 bill. Write an expression for how much change he should get back.
- 6) You create a word problem and write an expression for it—work with a partner if you like!

Lesson 4: Convert Fractions, Order of Operations

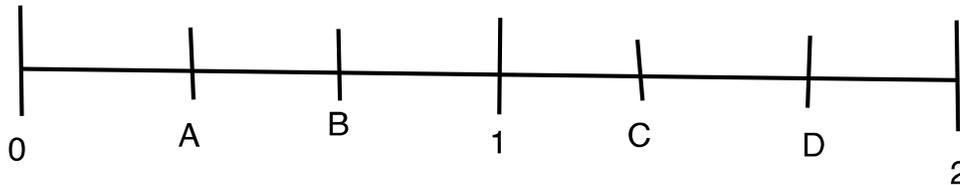
Answers:

- 1) Account balance – (two pairs of socks x cost of each): $\$325 - (\$6.49 \times 2)$
- 2) Cost of nails and cost of paint and amount of change back = money he gave clerk: $\$5.99 + \$39.00 + \$5.01$
- 3) First pipe + second pipe all divided by two: $(6.8 + 1.5) \div 2$
- 4) For one worker, it takes 60 minutes \div 4 minutes per box. Double that for 2 workers: $(60 \div 4) \times 2$. Parentheses are optional.
- 5) He has \$20 and spends 3 x \$4.99 plus 2 x \$1.25: $\$20 - (3 \times 4.99) - (2 \times \$1.25)$

Lesson 4 Extra Problem: Fractions and Decimals

Time: 10 Minutes

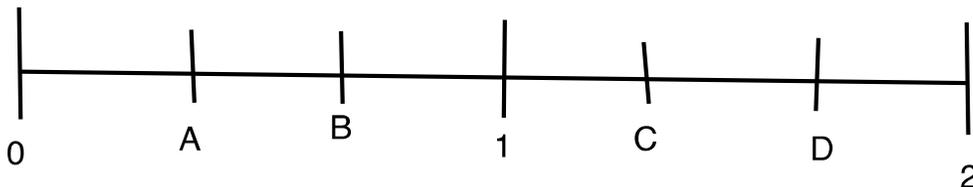
1. Write the following number line on the board. Make 10 equal spaces between 0 and 10. Have students write numbers that represent each letter. Do the first one together.
 - a. Basic Question: Write fractions and change to equivalent decimals and percents.
 - b. Extension Questions: Add additional fractions with decimals on the number line.



Answers:

- $A = 1/10 = 0.1 = 10\%$
- $B = 4/10$ (reduced to $2/5$) $= 0.4 = 40\%$
- $C = 7/10 = 0.7 = 70\%$
- $D = 9/10 = 0.9 = 90\%$
- For the extension, students may add $1/4$ or $3/4$ for example.

2. Do the same activity with a second number line:



Answers:

- $A = 1/3 = 0.33 = 33\%$
- $B = 2/3 = 0.67 = 67\%$
- $C = 1 \frac{1}{3} = 1.33 = 133\%$
- $D = 1 \frac{2}{3} = 1.67 = 167\%$

Lesson 4 Exit Ticket**Time: 10 Minutes**

Have students complete the problems on the slip provided below.

There are about a quarter of a million words in the English language (per the Oxford English dictionary). We use only 7,000 words on a daily basis.

- Write a fraction for how many words we use $(7,000/250,000)$
- Reduce the fraction to lowest terms $(7/250)$
- Change the fraction to a decimal (0.028) and a percent (2.8%)

Exit Ticket

There are about a quarter of a million words in the English Language (per the Oxford English Dictionary). We use only 7,000 words on a daily basis.

- 1) Write a fraction for how many words we use.
- 2) Reduce the fraction to lowest terms.
- 3) Change the fraction to a decimal and a percent.

Exit Ticket

There are about a quarter of a million words in the English Language (per the Oxford English Dictionary). We use only 7,000 words on a daily basis.

- 1) Write a fraction for how many words we use.
- 2) Reduce the fraction to lowest terms.
- 3) Change the fraction to a decimal and a percent.