



1.7

A Taxing Set of Problems

Personal Finance

SPECIFIC OBJECTIVES

By the end of this lesson, you should understand that

- the order of operations is needed to communicate mathematical expressions to others.

By the end of this lesson, you should be able to

- perform multistep calculations using information from a real-world source.
- rewrite multistep calculations as a single expression.
- explain the meaning of a calculation within a context.

PROBLEM SITUATION: FICA TAXES

The United States government requires that businesses pay into two national insurance programs—Social Security and Medicare—which help senior citizens pay for their personal **expenses** (things that a person or people spend money on) and health care. Businesses take money out of their employees' paychecks in order to pay the government. In other words, if you work for a business, your employer deducts Social Security and Medicare taxes from your paycheck. Also, the business pays a portion of the taxes for you. These taxes are called Federal Insurance Contributions Act (FICA) taxes.

People who own their own businesses are self-employed. They have to pay their own taxes. This is called the self-employment tax. In this problem situation, you will calculate how much three self-employed individuals owe in self-employment tax. You will do this by using a tax worksheet called the Short Schedule SE. This is an **Internal Revenue Service (IRS)** tax form. The IRS is the part of the government that collects taxes. It has many different types of forms that help individuals figure out how much they owe in taxes.

- (1) Below is a copy of a blank Short Schedule SE.¹ Recall that the PNL included some important vocabulary words and examples that can help you answer this question.

Marianne Lopez has a part-time job as a math tutor. She offers tutoring services to students both in person and online. In 2013, she earned \$11,385 in **revenue**, or the amount of money she received from selling her service. Her expenses totaled \$3,862. How much self-employment tax does Marianne owe?

Note: Marianne does not have a farm, and she does not receive social security retirement or disability benefits. She is also not a minister or a member of a religious order. You do not need to know which schedule or form Marianne's **net profit** (the actual amount of money made after expenses) comes from. You also do not need to calculate line 6.

Section A—Short Schedule SE. Caution. Read above to see if you can use Short Schedule SE.

1a	Net farm profit or (loss) from Schedule F, line 34, and farm partnerships, Schedule K-1 (Form 1065), box 14, code A	1a		
b	If you received social security retirement or disability benefits, enter the amount of Conservation Reserve Program payments included on Schedule F, line 4b, or listed on Schedule K-1 (Form 1065), box 20, code Z	1b	()
2	Net profit or (loss) from Schedule C, line 31; Schedule C-EZ, line 3; Schedule K-1 (Form 1065), box 14, code A (other than farming); and Schedule K-1 (Form 1065-B), box 9, code J1. Ministers and members of religious orders, see instructions for types of income to report on this line. See instructions for other income to report	2		
3	Combine lines 1a, 1b, and 2	3		
4	Multiply line 3 by 92.35% (.9235). If less than \$400, you do not owe self-employment tax; do not file this schedule unless you have an amount on line 1b ▶ Note. If line 4 is less than \$400 due to Conservation Reserve Program payments on line 1b, see instructions.	4		
5	Self-employment tax. If the amount on line 4 is: • \$113,700 or less, multiply line 4 by 15.3% (.153). Enter the result here and on Form 1040, line 56, or Form 1040NR, line 54 • More than \$113,700, multiply line 4 by 2.9% (.029). Then, add \$14,098.80 to the result. Enter the total here and on Form 1040, line 56, or Form 1040NR, line 54	5		
6	Deduction for one-half of self-employment tax. Multiply line 5 by 50% (.50). Enter the result here and on Form 1040, line 27, or Form 1040NR, line 27	6		

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Schedule SE (Form 1040) 2013

¹ "Self-Employment Tax (Social Security and Medicare Taxes)," *Internal Revenue Service*, accessed May 9, 2014, <http://www.irs.gov/Businesses/Small-Businesses-%26-Self-Employed/Self-Employment-Tax-Social-Security-and-Medicare-Taxes> (form downloaded from: <http://www.irs.gov/pub/irs-pdf/f1040sse.pdf>).

- (2) Leigh Olson started a small bakery at the end of 2013. She has no income to report on line 1a or line 1b of Schedule SE. She earned \$1,050 in revenue selling cookies and cupcakes. Her expenses totaled \$630. How much self-employment tax does Leigh Olson owe?

Note: Leigh does not have a farm, and she does not receive social security retirement or disability benefits. She is also not a minister or a member of a religious order. You do not need to know which schedule or form Leigh's net profit comes from. You also do not need to calculate line 6.

Section A—Short Schedule SE. Caution. Read above to see if you can use Short Schedule SE.

1a Net farm profit or (loss) from Schedule F, line 34, and farm partnerships, Schedule K-1 (Form 1065), box 14, code A	1a		
b If you received social security retirement or disability benefits, enter the amount of Conservation Reserve Program payments included on Schedule F, line 4b, or listed on Schedule K-1 (Form 1065), box 20, code Z	1b	()
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- (3) In Question 1, you learned about Marianne Lopez. You used the Short Schedule SE form to calculate how much self-employment tax Marianne owes. Now, write the calculation you completed to answer Question 1 as a single expression. An example of a single expression is shown below.

Example: The following calculations,

$$19 - 4 = 15$$

$$5.75 * 15 = 86.25$$

$$0.3 * 86.25 = 25.875$$

$$\text{Can be written as a single expression: } 0.3(5.75)(19 - 4) = 25.875$$

- (4) Look back at the single expression you wrote for Question 3. Imagine you have to explain the expression to Marianne to help her understand how you calculated the amount of self-employment tax that she owes. Answer these questions about the expression:
- (a) What does the operation $\$11,385 - \$3,862$ represent for Marianne?
 - (b) What does the operation of multiplying by 0.9235 represent for Marianne?
 - (c) What does the operation of multiplying by 0.153 represent for Marianne?

SELF-EMPLOYMENT AND THE MEDICARE TAX

The Affordable Care Act was passed by Congress and signed into law in 2010. The law reforms the health care system in the United States by protecting consumers from losing their health insurance, bringing down insurance costs, expanding access to health care services, strengthening Medicare with added benefits, and improving the quality of health care for Medicare patients. **Medicare** is a federal (government-run) health insurance program for seniors, people who are 65 and older, in the United States. All taxpayers pay into the Medicare program.

In order to raise revenue to support the expansion of care under the Affordable Care Act, the U.S. government created an additional Medicare tax for individuals with higher incomes. People who are self-employed use Part II of Form 8959 to determine how much additional Medicare tax they have to pay (if any).² Only individuals and couples with incomes over certain amounts have to pay this tax. These amounts appear in line 9 of Form 8959.

Part II Additional Medicare Tax on Self-Employment Income			
8	Self-employment income from Schedule SE (Form 1040), Section A, line 4, or Section B, line 6. If you had a loss, enter -0- (Form 1040-PR and Form 1040-SS filers, see instructions.)	8	\$215,500
9	Enter the following amount for your filing status: Married filing jointly \$250,000 Married filing separately \$125,000 Single, Head of household, or Qualifying widow(er) \$200,000	9	\$200,000
10	Enter the amount from line 4	10	\$0
11	Subtract line 10 from line 9. If zero or less, enter -0-	11	\$200,000
12	Subtract line 11 from line 8. If the result is zero or less, enter -0-	12	
13	Additional Medicare Tax on self-employment income. Multiply line 12 by 0.9% (.009). Enter here and go to Part III	13	

² "Self-Employment Tax (Social Security and Medicare Taxes)," *Internal Revenue Service*, accessed May 9, 2014, <http://www.irs.gov/Businesses/Small-Businesses-%26-Self-Employed/Self-Employment-Tax-Social-Security-and-Medicare-Taxes> (form downloaded from: <http://www.irs.gov/pub/irs-pdf/f1040sse.pdf>).

- (5) Andie Henson is a single, self-employed psychiatrist. Her self-employment income from Schedule SE (Form 1040) Section A was \$215,500. She did not earn wages from another job in 2013. This information has already been entered in lines 8–11 of Form 8959. Use mental math to find the exact value of line 12 and add it to the form. Then, *estimate* the value of line 13 and record your estimate in the space below. Do not use a pencil and paper or a calculator. Briefly explain your estimation strategy.
- (6) Now, *calculate* the Additional Medicare Tax that Andie owes and enter this in line 13. How does the calculation compare to your estimate in Question 5?

MAKING CONNECTIONS

Record the important mathematical ideas from the discussion.

FURTHER APPLICATIONS

Workers in the United States pay several types of taxes on income. This lesson discussed the FICA tax. You also have to pay federal income tax. Your federal income tax rate is based on the amount of money you make. Income is broken into levels called tax brackets. The table below shows the tax brackets for 2014.³

Taxable Income	Tax
\$0–\$9,075	10% of taxable income
\$9,076–\$36,900	\$907.50 plus 15% of excess over \$9,075
\$36,901–\$89,350	\$5,081.25 plus 25% of excess over \$36,900
\$89,351–\$186,350	\$18,193.75 plus 28% of excess over \$89,350
\$186,351–\$405,100	\$45,353.75 plus 33% of excess over \$186,350
\$405,101–\$406,750	\$117,541.25 plus 35% of excess over \$405,100
\$406,751 plus	\$118,118.75 plus 39.6% of excess over \$406,750

- (1) (a) Write a single expression that you can use to calculate the income tax for a person earning \$63,500. (**Note:** You will complete the calculation in Question 7(c) of OCE 1.7.)
- (b) The \$5,081.25 in the third line of the table is based on information from the previous two lines. Explain how the \$5,081.25 is calculated. (**Hint:** Start by thinking about where the \$907.50 in line 2 came from.)

³ Kyle Pomerleau, "The 2014 Tax Brackets," *Tax Foundation*, November 27, 2013, accessed May 8, 2014, <http://taxfoundation.org/article/2014-tax-brackets> (table shows Tax Brackets for single filers).

Out-of-Class Exercises

A Taxing Set of Problems

MAKING CONNECTIONS TO THE LESSON

- (1) Which of the following was one of the main *mathematical* ideas of the lesson?
 - (i) The order of operations follows this order: 1) Within parentheses; 2) Exponents; 3) Multiplication; 4) Division; 5) Addition; 6) Subtraction.
 - (ii) Taxes are very complicated, and tax forms are hard to complete.
 - (iii) Part of quantitative reasoning is being able to read, interpret, and use quantitative information to perform a task.
 - (iv) It does not matter how you write your calculations as long as you get the correct answer.
- (2) Refer back to Question 5 in Lesson 1.5 and Question 4 in this lesson (1.7). What important quantitative reasoning skill was used in both of these questions? Choose the best answer from the following.
 - (i) Both questions related to making sense of credit card fees.
 - (ii) Both questions related to making sense of numbers and calculations.
 - (iii) Both questions related to making sense of personal finance.
 - (iv) Both questions related to making sense of taxes.

DEVELOPING SKILLS AND UNDERSTANDING

- (3) Martin Binford is an author. He has no income he would report on line 1a or line 1b of his Schedule SE.⁴ He earned \$143,380 in 2013 from his books. He had \$3,563 in expenses. **Note:** He records his net profit in line 2, where it says “Net profit or (loss).” You do not need to know which schedule or form it comes from, and he is not a minister or member of a religious order. He also does not get a deduction for one-half of self employment tax. How much self-employment tax does he owe? Round to the nearest dollar.

⁴ “Self-Employment Tax (Social Security and Medicare Taxes),” *Internal Revenue Service*, accessed May 9, 2014, <http://www.irs.gov/Businesses/Small-Businesses-%26-Self-Employed/Self-Employment-Tax-Social-Security-and-Medicare-Taxes>. Form downloaded from: <http://www.irs.gov/pub/irs-pdf/f1040sse.pdf>.

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b If you received social security retirement or disability benefits, enter the amount of Conservation Reserve Program payments included on Schedule F, line 4b, or listed on Schedule K-1 (Form 1065), box 20, code Z	1b ()
2 Net profit or (loss) from Schedule C, line 31; Schedule C-EZ, line 3; Schedule K-1 (Form 1065), box 14, code A (other than farming); and Schedule K-1 (Form 1065-B), box 9, code J1. Ministers and members of religious orders, see instructions for types of income to report on this line. See instructions for other income to report	2		
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- (4) Which of the following expressions can be used to compute how much self-employment tax Martin Binford owes?

- (i) $0.029 + 0.9235(\$143,380 - \$3,563) + \$14,098.80$
- (ii) $0.029 \times 0.9235 \times \$143,380 - \$3,563 + \$14,098.80$
- (iii) $0.029(0.9235)(\$143,380 - \$3,563) + \$14,098.80$
- (iv) $0.029(0.9235)(\$143,380 - \$3,563 + \$14,098.80)$

- (5) The expression below shows another way to calculate Martin's tax.

$$0.153(113,700) + 0.029(129,121.00 - 113,700)$$

Based on this expression, select the statement that describes how Martin's income is taxed.

- (i) Martin pays 15.59% tax on his income.
- (ii) Martin pays 44.3% tax on his income.
- (iii) Martin pays 15.3% in tax on the first \$113,700 of his income. He pays 29% on his income over \$113,700.
- (iv) Martin pays 15.3% in tax on the first \$113,700 of his income. He pays 2.9% on his income over \$113,700.

- (6) Miguel is moving and wants to estimate what his electricity bill will be in his new apartment. He looks at old bills and sees that he uses around 700 kWh of electricity each month. The utility company charges \$6 each month plus 6.726 cents per kWh for the first 500 kWhs and 8.136 cents for each kilowatt-hour above 500.

(a) How much will Miguel pay for 700 kWh of electricity?

- (b) People often make a common error in situations like the one in (a). The purpose of the next two questions is to help you recognize this error and correct your work in (a) if necessary.

If someone bought three items for \$1.50, 37 cents and 5 cents, how much did they spend?

- (c) Which of the following is most likely the common error in (b)?

- (i) Making an addition error such as $37 + 5 = 45$ cents
- (ii) Forgetting to change the cents to dollars: $1.50 + 37 + 5 = \$43.50$
- (iii) Leaving off the decimal: $1.50 + 37 + 5 = \$4,350$

- (7) As discussed in the “Further Applications” section of this lesson (1.7), workers in the U.S. pay several types of taxes on income, including the FICA tax and the federal income tax. Your federal income tax rate is based on the amount of money you make. Income is broken into levels called tax brackets. The table below shows the tax brackets for 2014.⁵

Taxable Income	Taxes Owed
\$0–\$9,075	10% of taxable income
\$9,076–\$36,900	\$907.50 plus 15% of excess over \$9,075
\$36,901–\$89,350	\$5,081.25 plus 25% of excess over \$36,900
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\$405,101–\$406,750	\$117,541.25 plus 35% of excess over \$405,100
\$406,751 plus	\$118,118.75 plus 39.6% of excess over \$406,750

(a) Calculate the income tax for a person earning \$25,000. Round to the nearest dollar.

(b) Calculate the income tax for a person earning \$63,500. Round to the nearest dollar.

⁵ Table shows Tax Brackets for single filers. Pomerleau, Kyle, “The 2014 Tax Brackets.” *Tax Foundation*, 27 Nov. 2013, accessed May 8, 2014, <http://taxfoundation.org/article/2014-tax-brackets>.

- (c) Refer to your answer for (b). The total tax in (b) is what percentage of the person's income? Round to the nearest one percent.

MAKING CONNECTIONS ACROSS THE COURSE

- (8) In Lesson 1.6, it was determined that the water footprint for a typical American is $2,841 \text{ m}^3/\text{year}$.
- (a) A family of three would like to reduce their water footprint so that it is 75% of the typical American's water footprint. Which expression shows how they can calculate their target water footprint for one day? There may be more than one correct answer.
- (i) $(3 \times 2,841 \times \frac{3}{4}) \div 365$
 - (ii) $2,841 \times 3 \times 0.75$
 - (iii) $3 \times 2,841 \times 0.75 \div 365$
 - (iv) $2,841 \times 3 \times \frac{4}{3} \div 365$
 - (v) $2,841 \times 3 \div 0.75$
 - (vi) $2,841 \div (365 \times 0.75) \times 3$
 - (vii) $3 \times (2,841 \times 0.75) \div 365$
- (b) One thing a person can do to reduce his or her water footprint is to use less water every day. If each American were to reduce his or her daily water use by 2 m^3 (528 gallons), how would you calculate the new annual water footprint for a typical American? There may be more than one correct answer.
- (i) $2,841 - 2 \times 365$
 - (ii) $(2,841 - 2) \times 365$
 - (iii) $2,841 - (2 \times 365)$
 - (iv) $2,841 \times 365 - 2$
 - (v) $2,841 - 365 \times 2$
 - (vi) $(2,841 \div 365 - 2) \times 365$
 - (vii) $2,841 \div 365 - 2$

Preparing for the Next Lesson (1.8)

- (1) Which of the following represents 0.02%? There may be more than one correct answer.
- (i) 2
 - (ii) 0.02
 - (iii) 0.0002
 - (iv) 2 out of 100
 - (v) 0.2 out of 100
 - (vi) 0.02 out of 100
 - (vii) 2 out of 1,000
 - (viii) 2 out of 10,000
- (2) Which of the following is equivalent to 4%? There may be more than one correct answer.
- (i) 0.04
 - (ii) $\frac{1}{25}$
 - (iii) $\frac{4}{100}$
 - (iv) $\frac{40}{100}$
 - (v) 2 out of 5
 - (vi) 4 out of 100
- (3) Which of the following is correct? There may be more than one correct answer.
- (i) A percent is one part out of 100 parts.
 - (ii) A percent can be converted into a decimal number by dividing that percent number by 100.
 - (iii) A percent can be converted into a decimal number by moving the decimal point two places to the left and removing the percent sign (%).
 - (iv) 50% means 50 per 100 or $\frac{50}{100} = 0.5$.
- (4) Which of the following is the percent estimate of $\frac{1}{3}$, rounded to the nearest hundredth of a percent?
- (i) 0.33%
 - (ii) 3.3%
 - (iii) 33.3%
 - (iv) 33.33%

- (5) The quantity 1,352 is what percent of 40,929? Round to the nearest tenth of a percent.
- (6) You will be expected to do the following things for the next class. Rate how confident you are on a scale of 1–5 (1 = not confident and 5 = very confident).

Before beginning Lesson 1.8, you should understand the concepts and demonstrate the skills listed below.

Skill or Concept: I can ...	Rating from 1 to 5
understand the word percent and the notation used to describe percentages (%).	
use a calculator to divide two numbers and interpret the resulting decimal representation as a percent.	
calculate and estimate percentages.	

Self-Regulating Your Learning: The Work Phase

In an earlier lesson, you read in detail about what it means to effectively *plan* for your learning. That involved accounting for time and effort, your confidence (self-efficacy), study strategies, and learning goals. In this lesson, we will discuss the second phase of self-regulated learning (SRL), the **work** phase.

As the name implies, the *work* phase of SRL is where you are actually working on the problem or assignment. However, it is more than just getting the assignment done. In this phase, you **monitor** or pay attention to a variety of things. For example:

- What you are or are not **understanding** (and when)
- Which **strategies** you are using; which ones are working, and which ones are not
- What **emotions** and feelings you are experiencing, both positive and negative
- When you should **seek help** from others

Let's explore each of these in a little more detail.

Understanding: Self-regulated learners monitor what they understand and what they do not. This is done by frequently asking yourself: “Do I understand this?” or “Could I explain this to someone?” The goal is to monitor your understanding so that you may adapt your strategies, especially if you get stuck. Being honest about your understanding is important because it can help you progress successfully on a problem, or make you aware of your learning strengths and weaknesses. Sometimes, people talk about this as “thinking about your thinking.” Researchers call it *metacognition*.

Strategies: In learning about the SRL *plan* phase, you discovered that it can be useful to think about multiple strategies *before* you start working on a problem. In the *work* phase of SRL, having multiple strategies in mind (both those you have used before and those you plan to try) can help when you get stuck. You can stop, think about how the problem is progressing, and try another strategy that you think might work. Self-regulated learners often make mental notes about which strategies work in which

situations, and which ones are easiest to use. Evaluating strategies allows you to become better at solving a variety of problems.

Emotions: Self-regulated learners know how to monitor their emotions—especially negative ones such as frustration or anger—so that these emotions do not cause them to give up on a problem. When they start feeling frustrated, self-regulated learners often do things such as try new strategies, seek help, or engage in *positive self-talk*. This is saying things to yourself such as: “I know I can do this if I choose the right strategies and put in the effort, even if it is challenging.” The opposite is called *negative self-talk*, which involves saying things such as: “I am never going to get this! What is the point?” Monitoring and controlling your emotions, especially the negative ones, can be challenging and may require a lot of practice, but the benefits are worth it.

Seeking Help: With practice and experience, self-regulated learners know when it is beneficial to stop working and find someone else with whom they can discuss the problem. There is nothing wrong with getting help when you are learning something new. Some people think that asking for help means you do not have ability, but the truth is that knowing when to seek help is part of being an effective learner. Seeking help can save you time because you avoid the added frustration of making a lot of effort without making any progress. If you are spending a lot of time on a problem, you have tried several strategies without success, or you are not able to control negative emotions, stop and write down your questions. Bring the written questions with you and discuss the problem with someone else as soon as you can. Help could come from your instructor during his or her office hours, a campus learning center, or other classmates.

During the *work* phase, you are required to juggle two things at once: (1) working on the problem or assignment, and (2) monitoring your progress (e.g., *thinking about your thinking*). This process takes practice; however, it is important to master if you want to become a self-regulated learner. Thinking about how you are working makes the work easier and gives you information for the SRL *reflect* phase. You will explore the *reflect* phase in an upcoming lesson. Until then, practice these work strategies while you are working on problems and class assignments.