

# Contextualized Curriculum

for Adult Learners in Math and Literacy

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## Building Tools for Calculating Payroll

Print:   

*How programmers use their knowledge of calculating with fractions, decimals, and percentages to develop databases that automatically calculate and track [payroll](#) information*

**Industry Sector:** [Information Technology](#)

**Content Area:** [Mathematics](#)

**Core Topic:** [Decimals, fractions and percents](#)

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### Common Core State Standards

#### Standards for Mathematical Practice:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

#### High School—Number & Quantity: Quantities

**N-Q.1.** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

**N-Q.2.** Define appropriate quantities for the purpose of descriptive modeling.

**N-Q.3.** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

#### High School—Modeling

#### High School—Algebra: Creating Equations

#### Seeing Structure in Expressions

**Interpret the structure of expressions.**

**A-SSE.1.** Interpret expressions that represent a quantity in terms of its context.★

- Interpret parts of an expression, such as terms, factors, and coefficients.
- Interpret complicated expressions by viewing one or more of their parts as a single entity.

**A-SSE.2.** Use the structure of an expression to identify ways to rewrite it.

### **Write expressions in equivalent forms to solve problems.**

**A-SSE.3.** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.★

- Factor a quadratic expression to reveal the zeros of the function it defines.
- Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.
- Use the properties of exponents to transform expressions for exponential functions. *For example the expression  $1.15t$  can be rewritten as  $(1.151/12)12t \approx 1.01212t$  to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.*

**A-SSE.4.** Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.★

### **Create equations that describe numbers or relationships.**

**A-CED.1.** Create equations and inequalities in one variable and use them to solve problems.

**A-CED.2.** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

**A-CED.3.** Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.

**A-CED.4.** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

## Adult Basic Education Standards

### **Number Sense**

**Standard N-1:** Represent and use numbers in a variety of equivalent forms in contextual situations.

### **Patterns, Functions and Algebra**

**Standard P-1:** Explore, identify, analyze, and extend patterns in mathematical and adult contextual situations.

**Standard P-2:** Articulate and represent number and data relationships using words, tables, graphs, rules, and equations.

**Standard P-3:** Recognize and use algebraic symbols to model mathematical and contextual situations.

## **Standard P-4:** Analyze change in various contexts.

### Industry Overview

From computer programmers to [web developers](#), and from network administrators to technical support specialists caring for the IT infrastructure, there are information technology (IT) careers available in every sector of the economy. While some people in this field work for IT companies, IT skills and services are needed in fields as wide-ranging as financial services, medical services, biotechnology, engineering and environmental services<sup>1</sup>. The IT industry designs, develops, manages and supports the hardware, software, multimedia and networks we depend on in our daily lives and businesses. IT has revolutionized our world—from the ways we communicate to how we find information to how businesses operate. Job growth in the US IT industry is high and is projected to continue for many occupations within the industry. The field is constantly growing and changing and there are high levels of competition which makes it important for IT workers to keep updating their skills and to understand the latest technologies.

### **Careers in Information Technology<sup>2</sup>**

Information technology careers are divided into four pathways: Network Systems, Information Support and Services, Programming and Software Development, and Web and Digital Communications.

Careers in Network Systems involve network analysis, planning and implementation, including design, installation, maintenance and management of network systems. Examples of network systems occupations include: network administrator, network technician, PC support specialist, telecommunications network technician, data communications analyst, and security administrator.

Careers in Information Support and Services involve IT deployment, including implementing computer systems and software, providing technical assistance, and managing information systems. Successful IT deployment is critical to the success of most organizations—the management and sharing of information depends on non-IT workers having functional computers, software and databases that meet their needs, and support when things aren't working. Information systems and support occupations include [database](#) administrator, enterprise systems engineer, help desk specialist, technical support specialist, and technical writer.

Careers in Programming and Software Development involve the design, development, implementation and maintenance of computer systems and software and require knowledge of computer operating systems, programming languages and software development. While many of the career opportunities in this area are in software companies, large organizations of other types—such as financial services—also offer many opportunities. Programming and software development careers include: software applications architect, operating systems designer/engineer, computer programmer, video game developer, applications engineer, and applications developer.

Careers in Web and Digital Communications involve creating, designing and producing interactive multimedia and social media products and services and include development of digitally-generated or computer-enhanced media used in business, training, entertainment, communications and marketing. Organizations of all types and sizes use digital media (such as the Internet and social media platforms) to communicate with existing and potential customers, to track transactions, and to collaborate with colleagues. Occupations in this pathway include web designer, webmaster, 3D animator, virtual reality specialist, and multimedia producer.

### **Mathematics and Literacy Skills Needed in Information Technology**

The complexity of the IT industry, including the rapid pace of change in technology, requires workers to continuously upgrade their skills. Jobs in this industry require good problem-solving, critical-thinking, and reasoning; clear and professional communication; and a strong background in mathematics. Thus, in addition to technical skills specific to each job, mathematics and literacy skills are crucial for success in all occupations across the industry. Literacy is essential in this field as it is heavily dependent on written and oral communication, and workers need to be able to read,

understand, and implement highly-technical content. Workers in this industry must communicate with clients, colleagues, and other departments and staff, including executives.

Regardless of how technologies change, a strong foundation in mathematics, particularly with such core areas as mathematical operations and number sense, measurement and estimation, ratios and proportions, and data analysis is very useful in this industry. For example, programmers and developers must be able to employ quick and competent computation and have the ability to select and apply the best mathematical model or formula to solve problem at hand.

### **Career Opportunities in IT with Education from Community Colleges**

Massachusetts Community Colleges play a crucial role in preparing students for careers in IT across all sectors of the industry. The fifteen community colleges offer associate degree and certificate programs that prepare students to enter occupations across all sectors of the industry, from network administrators to technical support specialists to computer programmers to Web designers. For example, [Cape Cod Community College's Department of Business](#) has an IT program that prepares students for a range of positions through both the Information Technology A.S. degree and certifications that offer skills in specific concentrations in this field, such as networking and web design.

### **Recent Career Opportunities in Massachusetts**

The following is a sample of IT job listings in Massachusetts that require associate's degree or certificate:

- Help Desk Technician [[show](#)]
- PC Technician [[show](#)]

The following is information about hires of recent IT graduates from Massachusetts community colleges:

- [Bristol Community College, Computer information Systems: Computer Networks](#)
- [Mount Wachusett Community College, Computer Information Systems](#)

### **Employment Outlook for Information Technology**

Given the ubiquity of IT in the U.S. and the world today, employment in this industry continues to boom. Even during the current recession, there has continued to be high demand for workers with good technical, problem-solving and critical-thinking, and communication skills in the IT industry. The U.S. Bureau of Labor Statistics reported in its 2012-13 edition of the Occupational Outlook Handbook that employment in the industry is expected to grow "much faster than the average" of all occupations through 2020. Massachusetts has very high levels of employment and numbers of job openings in many IT occupations across the state. In 2011, it was one of the top seven states for employment opportunities in the industry. Furthermore, Middlesex and Suffolk counties were among the top 20 counties nationally listing IT positions.

However, within the IT industry, job growth and openings vary due to technological changes and competition (especially foreign). For example, employment for computer programmers in Massachusetts and nationally continues to be high, but is declining—future jobs will go to people with strong technical, cognitive, intrapersonal, and interpersonal skills. Likewise, lower-skilled jobs such as computer support specialists will have lower employment growth due to outsourcing (though help desk personnel are always needed in larger firms to assist non-IT staff with maintenance, [troubleshooting](#), and repair). The highest growth areas in IT—nationally and in Massachusetts—are in such occupations as computer and information systems managers, computer systems analysts, and computer specialists.

### **Resources**

Employment Outlook

- [Massachusetts Career Information System](#)
- [U.S. Bureau of Labor Statistics: Occupational Outlook Handbook, Computer and Information Technology](#)

- [Jobs for the Future: An Examination of the Information Technology Job Market \(2012\)](#)

#### Occupational Information

- [Massachusetts Career Information System](#)
- [U.S. Bureau of Labor Statistics: Occupational Outlook Handbook, Computer and Information Technology](#)
- [WorkKeys Occupational Profiles](#)
- [WorkKeys: Occupations and Key Skills](#)
- [Information Technology Career Clusters](#)
- [Information Technology Career Frames](#)

<sup>1</sup><http://www2.edc.org/ewit/materials/ITCCBRO.pdf>

<sup>2</sup>As cited in <http://www2.edc.org/ewit/materials/ITCCBRO.pdf>

#### Workplace Scenario (8th Grade Level)

This scenario is based on the work of a programmer. For more information, view [this video](#).

You are a programmer working for a small company in Massachusetts. Your team develops databases for employee payrolls. These databases calculate and track [payroll](#) amounts. The [payroll](#) amount is based on the number of hours each employee works in a pay period. The hours are then multiplied by the person's hourly rate. Sometimes an hourly employee works more than his or her scheduled hours. In these cases, he or she is paid overtime. Overtime usually equals one-and-a-half times or double an employee's hourly rate.

Salaried employees are paid the same amount each pay period. There may also be casual employees. Casual employees work different numbers of hours each pay period. They do not receive [benefits](#) or paid time off.

The [database](#) must also calculate and track [deductions](#) for various government taxes. It should also track any voluntary [deductions](#), such as flexible spending plans. This type of deduction is taken out of employee paychecks and is not taxed. It can be used for health and childcare costs. It is a fixed amount chosen by the employee. It is deducted evenly across the pay periods in a year.

Your team needs to develop each [database](#) so that the company's [payroll](#) is correct. It is very important for tax information to be correct. Failing to pay correct taxes can lead to fines or legal action. You also sometimes must present your work to the [client](#) for input.

#### Workplace Scenario (High School Level)

This scenario is based on the work of a programmer. For more information, view [this video](#).

You are a programmer working for a small technology development firm in Massachusetts. Your team develops databases for firms to calculate and track employee [payroll](#) information. These databases calculate [payroll](#) amounts. The [payroll](#) is based on the number of hours each employee works in a pay period and the hourly rate for that employee. If an employee is paid hourly and works more than his or her regularly scheduled number of hours during the pay period, he or she is paid overtime. Overtime is typically one-and-a-half times or double their usual hourly rate. Salaried employees are paid the same amount each pay period unless they take unpaid time off. There may also be casual employees who work different numbers of hours each pay period. These employees do not receive [benefits](#) and do not [accrue](#) paid time off.

The [database](#) must also calculate and track [deductions](#) for federal and state income taxes, Social Security and Medicare taxes, and any voluntary [deductions](#). An example of a voluntary deduction is the Commonwealth Qualified Transportation Benefit Program or health and dependent care flexible spending plans. Flexible spending plans are pre-tax money that is taken out of employee paychecks to

pay for qualifying health and childcare expenses. Taxes are percentages of an employee's income. In contrast, voluntary [deductions](#) are fixed amounts selected by the employee. They are deducted evenly across the pay periods in a year.

You and your fellow programmers need to conceptualize how to develop each [database](#) to meet the particular needs of a company. The [database](#) must make all of the necessary calculations so that the company's [payroll](#) is correct. It is essential that tax calculations are correct. Failure to pay correct taxes can lead to large fines and even prosecution. Because your firm is small, you sometimes are required to present the [database](#) to the [client](#) for feedback and final revisions.

## Core instructional context

Fractions, decimals and percents are the numbers that we use in our daily lives—dealing with money, measuring ingredients in a recipe, dividing things evenly between children, mixing formula for a baby—all of these tasks require using parts of a whole. Similarly, in the workplace, the numbers that people use are rarely whole numbers—whether they are handling money, managing medication dosages, cutting fabric to make clothing, or calculating the time it takes to complete a particular task. In order to be confident working with fractions, decimals and percents, students need to be able to calculate, compare and move quickly from one form to another in their daily lives as well as in mathematics class. Understanding that one part of two be expressed as  $\frac{1}{2}$ , 0.5, or 50%, or how to add  $\frac{3}{4}$  and  $\frac{1}{2}$ , and then being able to apply this knowledge to solve problems involving numbers are important life skills and lay the foundation for algebra and advanced mathematics.

The programmer in the scenario in this module is developing mathematical methods for computing financial information accurately. Good mathematical skills in arithmetic, fractions, decimals and percents are essential for managing business and personal finance, including understanding your paycheck and managing your personal budget. In the examples of contextualized activities, students work with fractions, decimals and percentages to:

- calculate and compare an employee's gross and net income;
- analyze paycheck stubs to understand the relationship between gross income and standard [deductions](#); and
- create simple databases in Excel to record and calculate various financial data.

Mathematics skills covered include:

- converting between decimals and percentages;
- calculating percentages of numbers;
- setting up equations to determine what percentage of a number another number is;
- creating a formula for and graphing functions; and
- designing and organizing a [database](#)

In addition to using mathematics to calculate financial data, the programmer probably also uses advanced mathematical skills, either directly or indirectly, on a daily basis. While not all programmers have advanced coursework in mathematics (many do!), most, if not all, are confident in mathematics, good at algebra, and have strong reasoning skills. A computer programmer will write code in a programming language such as PHP, Java, or JavaScript to create software programs. Each language will have its own set of commands and control structures that a computer can follow and the programmer needs to be able to translate a desired outcome, such as a processing a form submission, or sending an angry bird across the screen, into a sequence of steps. There are many tasks in which logic and mathematical skills are applied in this type of work, including:

- declaring and handling variables that hold numerical information;
- writing functions that involve conditional logic and algebraic calculations;
- creating loops, which specify how many times a given task is repeated in a program;
- declaring and handling variables that specify Boolean logic; and
- writing conditional statements that depend on Boolean variables (such as "if this is true, then do that").

Furthermore, program designs for specific applications can (and frequently do) involve many types of mathematical operations. For example:

- currency conversion software would require an understanding of ratios and unit conversions;
- aeronautical control software would require an understanding of the mathematical equations that govern flight; and
- an e-commerce website would require an understanding of how shipping costs are calculated.

Computer programs tackle a wide array of mathematical problems, which means that computer programmers must be able to understand and work with a wide array of mathematical ideas. The underlying skills of a programmer and the ability to communicate effectively with a computer and other programmers are often developed through higher levels of mathematics, such as working with functions, equations and variables.

### Worked Example

In this module, students analyze paystubs and use Excel to create a [database](#) to track and calculate [payroll](#). As an introduction to paycheck analysis, consider honing in on one specific deduction on a paystub, such as Medicare tax, to explore how the deduction was calculated. Provide students with opportunities to calculate percentages and convert between percentages and decimals, as well as explore advanced ways to express the relationships between amounts. For example, use formulas or graphs to present Medicare tax amount as a function of income.

(Note that paychecks include some complex financial data: the specific amounts of taxes deducted are affected by tax rates as well as how an employee fills out a W-4 form. Also, pre-tax [deductions](#), such as retirement funds, health care plans, flexible spending, and tuition reimbursement plans may vary widely from company to company and individual to individual. This module is not meant to teach all of this financial content, but rather to use real, but simplified scenarios, to practice mathematical skills.)

### Calculating Medicare Tax

Display a sample paystub like [this one](#).

Conduct a general discussion to assess students' ability to read and interpret different parts of the pay stub and identify the information presented. Ask students:

- Who is the person getting paid? Where is this information provided on the paystub and check?
- How much money is this person taking home? Where is this information provided?
- Find **gross pay** and **net pay** written on the paycheck stub. What is the difference between gross income and net income?
- What is a **deduction** and what are the different [deductions](#) listed on the paystub? What other [deductions](#) might be taken out of a paycheck?
- How are different [deductions](#) calculated? (**Answer:** Taxes are a percentage of income, while other [deductions](#), such as flexible spending, are usually a specific amount that is deducted.)

Have students find the Medicare tax amount on the paycheck stub. Ask students:

- What is Medicare tax? Why is it deducted from your paycheck? (**Answer:** Medicare provides health [insurance benefits](#) for workers who have reached retirement age as well as disabled workers. All employees subject to federal taxes pay Medicare taxes.)
- What is the Medicare tax **amount** deducted for this pay period? (**Answer:** \$17.76)
- The Medicare tax is an amount usually deducted from the **gross income**. What is the gross income for this pay period? (**Answer:** \$1,249.54)
- In some cases—such as this one—**pre-tax deductions**, such as retirement plan payments or transportation fees, lower the **taxable wages**. The taxable wages are written on the bottom of this paystub (\$1225.04) The Medicare tax amount is a specific **percentage** deducted from the taxable wages.

As a review of calculating percentages, suggest using trial and error to find out what percentage the Medicare tax amount is. Allow students to continue with trial and error to find the correct percentage, or ask students to use a different method to find out what percentage \$17.76 is of \$1225.04, such as setting up an equation:

$$17.76 = X/100 * 1225.04.$$

Solving for X will yield 0.0145.

Medicare tax amount is 1.45% of taxable wages.

## Exploring Functions

Medicare tax is one of the few [deductions](#) that currently (as of 2012 tax laws) is the same percentage for all employees who pay taxes. Regardless of income, employees pay a Medicare tax that is equal to 1.45% of their gross income (or taxable wages).

Have students use Excel to determine the Medicare tax amount for any given income.

To do this, create and label two columns in Excel:

	A	B
1	Amount of Income	Amount of Medicare Tax
2	<i>In this cell, write a specific amount, such as \$100</i>	<i>In this cell, input a formula that will multiply the income amount by 1.45% (= A2 * 0.0145)</i>

### Example:

Income Amount	Medicare Tax Amount
\$ 100.00	\$ 1.45
\$ 200.00	\$ 2.90
\$ 500.00	\$ 7.25
\$ 1,000.00	\$ 14.50
\$ 2,000.00	\$ 29.00
\$ 3,000.00	\$ 43.50
\$ 4,000.00	\$ 58.00
\$ 5,000.00	\$ 72.50
\$ 10,000.00	\$ 145.00

The relationship between income size and the Medicare tax is an example of a function, or a relationship between two variables in which for each value assumed by one variable, there is a unique value determined for the other. The amount of Medicare tax as a function of income size is an example of a linear function, or a function that has a constant rate of change and can be represented by a straight line. This is an example of **direct variation**, a particular kind of linear function, in which the ratio between the two variables (in this case, income and Medicare tax) stays the same.



Students can also describe this relationship between income and Medicare tax using a formula:

**$m = 0.0145 \times i$**   
**where  $m$  is Medicare tax and  $i$  is gross income**

## Contextualized learning activities

### Pre-Reading

Present students with the following scenario:

*Alex just started a job as a part-time help desk assistant. He gets paid \$19 an hour and worked 20 hours last week. He "did the math" and knows that  $\$19 \times 20 = \$380$ . But his paycheck was only*



*\$273.60! He has checked his computation several times and he still gets \$380. Where did all his money go?*

Ask students how they would respond to Alex as to where his money went.

Ask students who have been employed previously if they look at their paychecks and paycheck stubs when they get paid. Ask students what information is generally provided on paystubs. Display several different paystubs. For example, display a paystub for an hourly worker who has worked a typical pay period, for someone who has earned overtime, for a salaried employee, and so on. Tell students that during this activity, they will explore the calculations that go into an individual's paycheck, as well as some of the mathematical thinking that goes into creating databases to manage the [payroll](#) for multiple people, or even an entire company.

### **Introduction to the Scenario**

Have students read the scenario in this module, circling or highlighting the mathematical-related concepts and terminology. Then have students share in pairs the terms they came up with.

The programmer in this scenario is responsible for creating a program that performs [payroll](#) calculations. Ask students to [brainstorm](#) the mathematics involved in calculating [payroll](#), as well as in creating a [database](#) to calculate and track the [payroll](#) for different kinds of employees.

Ask students what the purpose of a [database](#) or [payroll](#) software might be. Discuss the burden of doing [payroll](#) for lots of different kinds of employees (reflected in the different types of paychecks shown— for example, some are hourly and might earn overtime, while others are regular salaried employees; some are casual employees, employees who work different numbers of hours each pay period) all of whom may have different [benefits](#) and different withholdings. If possible, show some examples of [payroll](#) software or [database](#) programs, such as [this video](#). Tell students that while they will not create something as elaborate as these programs, they will explore the mathematical thinking behind these programs and apply that thinking to create a simple [database](#).

Ask students to [brainstorm](#) the kind of mathematics skills they use on a daily basis to manage their own money—including understanding their paychecks and bills, or using spreadsheets to manage their personal budget.

### **Analyzing a Paycheck**

Display or distribute copies of the [sample paycheck stub](#).

Have students work in pairs to do the following:

- Choose one amount presented on the paystub and explain what that amount is and how it was calculated. For example, students might explain that the net pay is the amount of money you get to take home, and it's calculated by subtracting all the [deductions](#) from the gross pay.
- Find one term/phrase or amount listed on the paystub that students don't understand
- Choose two or more amounts listed on the paystub for which students can describe the relationship. For example, they might explain that the pay rate listed (if hourly) is multiplied by the number of hours listed to yield the gross income for this pay period.

Have pairs share the terms and amounts they discussed and explain how they think those amounts were calculated, as well as the relationships among the different amounts listed on the paystub. Use this discussion to clarify misconceptions or misunderstandings about the different terms, amounts, [deductions](#), and how they are calculated.

Then have students work with a partner to answer the following questions:

- a. According to this paycheck stub, Jane worked \_\_\_\_\_ regular hours during this pay period, at a rate of \_\_\_\_\_ per hour, for a total amount of \_\_\_\_\_.

**Answer:** 40 hours, \$15.192 per hour, totaling \$607.68

b. What is Jane's overtime rate? Write an equation that expresses the relationship between her regular rate and her overtime rate.

**Answer:** Overtime rate is \$22.788, which is 1 ½ times her regular rate.  $22.788 = 15.192 \times 1.5$

c. Approximately what percentage of her gross income does Jane take home as her net income?

**Answer:** Approximately 78%

d. Jane has been looking around at other jobs and applied for computer support specialist positions at two different firms. She was offered two jobs. Firm A offered her a yearly salary of \$45,000 and Firm B offered her a job at an hourly wage of \$21 an hour. Both jobs are full-time and she will be expected to work 40 hours per week. Assume all other things are equal, which job should she take? Why?

**Answer:** All things equal, the salaried job (\$45,000) will pay a little bit more than the hourly job (which will pay approximately \$21 per hour x 40 hours per week x 52 weeks per year = \$43,680). However, this does not take into account other factors, such as healthcare and other [benefits](#), as well as overtime pay, which are often different for salaried versus hourly employees.

### Introduction to Spreadsheets

Have the class [brainstorm](#) a list of the types of data that might be included in a [payroll database](#).

Have students work in small teams to use Excel to create a simple [payroll database](#) that keeps track of basic [payroll](#) data. Start simple, providing students with the following data for five hourly employees:

Employee Name	Hourly Wage	# Hours Worked in Pay Period	Gross Income
Abigail	\$18.25	40	
Beatrice	\$11.50	40	
Carlos	\$11.25	40	
Donna	\$13.50	30	
Edward	\$19.25	20	

Discuss how to enter formulas to perform the calculations. In this first example, it's very simple: gross income = hourly wage x # of hours worked.

Have students revisit the paystubs they analyzed earlier and consider how to incorporate that information into their [database](#). Have teams choose one other piece of information that's on the paystub that they think should be included in a [payroll database](#) and that they can incorporate into their spreadsheet. For example, vacation time, Medicare tax amount, year-to-date income earned are items that are relatively straight-forward and could be added to their spreadsheet, while other [deductions](#), such as federal taxes, or 401k contributions would be more complicated to include.

Have teams present to the class which items they included and what formulas they would use to incorporate it into their spreadsheet.

### Contextualized test items

1. Joe is an assistant designer at your firm. He gets paid \$21 per hour for up to 40 hours a week. Beyond that, he gets paid time and a half for any hours worked more than 40. Last week, he worked 50 hours. How much will his **gross income** be for that week?

**Answer:** \$1155  
 $21 \times 40 + 10 \times 10.50$

Joe's regular rate is \$21. His overtime rate is 1.5 times that amount, \$31.50

Joe worked 40 hours at his regular rate:  $\$21 \times 40 = 840$ .

He worked 10 hours overtime,  $\$31.50 \times 10 = 315$

$840 + 315 = \$1,155$

2. Medicare tax is an amount that is deducted from employees' paychecks. All employees who are subject to federal taxes pay 1.45% of their income to Medicare tax.

1. Use a calculator or Excel to calculate the annual Medicare tax amount owed for each of the following employees:

Total Income (Gross Pay)	Medicare Tax Amount
\$ 25,000.00	
\$ 29,000.00	
\$ 50,000.00	
\$ 75,000.00	
\$ 62,000.00	
\$ 1,800.00	
\$ 2,500.00	
\$ 5,000.00	
\$ 10,000.00	

**Answer:**

Total Income (Gross Pay)	Medicare Tax Amount
\$ 25,000.00	\$ 362.50
\$ 29,000.00	\$ 420.50
\$ 50,000.00	\$ 725.00
\$ 75,000.00	\$ 1087.50
\$ 62,000.00	\$ 899.00
\$ 1,800.00	\$ 26.10
\$ 2,500.00	\$ 36.25
\$ 5,000.00	\$ 72.50
\$ 10,000.00	\$ 145.00

2. Which of the following statements about Medicare tax amount is true?

- a. As your income goes up, the *amount* of Medicare tax that you pay stays the same.
- b. As your income goes up, the *percentage* of Medicare tax that you pay stays the same.
- c. As your income goes up, the *amount* of Medicare tax that you pay goes down.
- d. As your income goes up, the *percentage* of Medicare tax that you pay goes up as well.

**Answer:** b. The percentage you pay stays the same, though the amount paid goes up proportionally.

3. Which of the following graph depicts Medicare Tax amount as a function of income amount:



**Answer:** a.

**3.** You are hiring a part-time babysitter for your three children, ages 1, 5 and 9. Your 9-year-old is in school full-time and your 5-year-old is in school part-time, so at times, your sitter will be taking care of one, two, or three children. You've established a pay rate for your babysitter as follows:

- \$10 an hour when sitting for 1 child;
- \$12 an hour when sitting for 2 children;
- \$13 an hour when sitting for 3 children; and
- overtime is \$15 an hour for any hours she works in a week above 40 hours, regardless of the number of children she's taking care of.

Create a spreadsheet that you can use to track her hours and pay. Then use your spreadsheet to calculate her pay for each of the following weeks:

- Week 1: She worked Monday through Thursday from 9- 4. From 9-2, she was just with the baby; then she picked up the other kids from school at 2 and had all three children from 2-4.

**Answer:** \$304

- Week 2: She worked Monday through Friday from 9-5. From 9-2, she was just with the baby; then she picked up the other kids from school at 2. One kid had soccer practice, leaving her with 2 kids from 3-5. She also worked 6 hours on Saturday with 2 kids.

**Answer:** \$525

### Contextualized project

Have students take on the role of owners of a new web design company. They need to hire employees and decide how much to pay them for various positions and create a [database](#) to keep track of employee [payroll](#).

Have students work in small teams to complete the following:

- "hire" at least three, but no more than 10 employees for their firm;
- create positions with a title and salary (either hourly or yearly) for each employee;
- allocate a number of sick days and vacation days for each employee;
- create a work and pay schedule for employees; and
- create a spreadsheet and calculate [payroll](#) for the first pay period that includes hours worked, gross pay, and standard [deductions](#) such as federal tax, state tax, Medicare and Social Security.

Have groups present their "companies" and their databases to the class.

### Additional or extension activities, multimedia, readings and/or resources

#### Extension Activity

Individually, create a spreadsheet in which you can track all of your spending. Use it to track everything you spend money on for a day, a week, or a month. Then analyze your spending. Use your spread sheet to figure out:

- What percentage of your spending was on food?
- What percentage of your spending was on rent or housing?
- What percentage of your spending was related to school expenses?

Create a monthly budget (or modify an existing one) based on your spending and your income. Continue to track your spending and compare it to your budget and to each month.

### Resources

[Explanation of Tax Rates for 2012, Internal Revenue Service](#)

[Payroll 101, CompuPay](#): Resources on how [payroll](#) is calculated and on [payroll](#) software

[Express Payroll, ADP](#): Demo of [payroll](#) software

[How to Set Up Payroll in Microsoft Access, eHow](#): Tutorial for setting up [payroll](#) in Microsoft Access

### Sample Paystubs:

<http://www.dir.ca.gov/dlse/PayStub.pdf>

[http://www.compupay.com/resource\\_center/payroll\\_101/](http://www.compupay.com/resource_center/payroll_101/)

<http://www.japersonalfinance.com/gsjapf/activities/page3.jsp?key=Activity1Page1>

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