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# To The Michigan Adult Education Student

## Overview

This is your mathematics workbook for Preparing Workers for 21st Century Jobs. The scenarios in Making Sense of Math at Work were written for you. Each selection includes a quote from a Michigan employer. Each quote is a message aimed directly at you!

Read each selection with the idea that you are the person in the problem. There are many different kinds of mathematics problems in the book. Michigan employers gave the writers ideas for the scenarios. When you complete them you will be better prepared to be a good employee.

## **Organization of the Scenarios**

**Quote**: This is a message from a Michigan employer to you.\* The quote is there to make you think about the kinds of mathematics you will need to be a good employee. Think about the quote to get an idea of what mathematics problems may come up at work.

**Vocabulary**: Words that will help you understand the scenario are listed under the quote. Be sure you can say the words and understand the meaning before you start. The Glossary in the back of the book will help. Words have many meanings. The definition in the Glossary is the same as in the scenario.

**EFF Work Readiness Profile Tasks**: This is a list of the kinds of mathematics tasks you might have to do at work. The scenarios in this book refer to this national list of skills workers need.

**Think About It!**: The questions ask you to think of the best way to handle the situation. Sometimes you will need to calculate numbers to get the answer. Other times, you can decide on an answer based on your understanding of the best way to handle the problem. Often you will have to look at a chart or graph to figure out the situation. There are many ways to solve problems at work. Understanding mathematics will help with many of them.

## **Getting Help**

Your teacher will have ways to help you understand the scenarios. Ask for help if you need it.

\* Company policy sometimes did not allow identification of business contributors. Even without being named, we thank those employers/companies for their ideas that helped make this workbook a success.

These materials were developed under a Federal grant awarded by the Michigan Department of Labor & Economic Growth. All Rights Reserved.

# **Allocate Resources and Solve Problems**



- Use basic math well enough to get the job done.
- Manage time effectively to:
  - Get the work done on schedule.
  - Prioritize tasks.
  - Make sure that urgent tasks are completed on time.
- Make sure that materials, tools, and equipment are available to do the job effectively.
- Cope with a work situation or tasks that change frequently:
  - Demonstrate flexibility.
  - Accept new or changed work responsibilities with a positive attitude.
  - Adjust to unexpected problems and situations by seeking advice from a supervisor or appropriate others.
- Identify actual or potential problems related to one's own work:
  - Report them in a timely manner according to company policy.
  - Help to fix them.



<sup>CC</sup> There's a real need for basic math in the workplace. An example is when someone needs to paint a room and asks a store employee what is needed, such as "How much paint do I need?" You need to know the size of the area to be painted. The number and size of the windows and doors are examples of additional important pieces of information to help give an accurate answer. All of this is necessary to figure out the square footage and how much each gallon of paint will cover. You can use a calculator but you need the basic information to be able to tell people if they need 2 gallons, 3 gallons etc."

Bob Chlebnik, Brown's Do It Best Hardware, Goodrich, MI (2008)

#### Vocabulary

Formula • Knowledgeable • Merchandise • Square foot

## Scenario 1: How Much Paint Do I Really Need?— Sam

Sam works in a hardware store. He enjoys his work and takes pride in knowing where things are located in the store. Sam can easily find the different hardware items that people request. Customers enjoy talking with Sam. He is always knowledgeable about the merchandise.

Jan comes into the store frequently. Sam is always able to assist Jan in finding what she is looking for in the store. Today, she asks Sam where the paint is located. Sam shows her the different brands and colors. Jan wants to paint her living room a dark blue color. She knows that the room is 30 feet long by 25 feet wide and has a standard height of eight (8) feet. However, she does not know how much paint to buy. Jan asks Sam how much paint she will need to paint her living room. Sam knows that one gallon of paint will cover 400 square feet. However, Sam does not know how to figure out the number of gallons of paint that Jan will need. Sam's boss usually works in the paint department, but he is gone for the day.

Jan is patiently waiting for Sam to tell her the answer. Sam looks again at the paint can. He is frustrated that he doesn't know how much paint Jan needs to buy. Sam never thought he'd have to use math in his job. He thought he could just tell people where things were in the store. Sadly, Sam tells Jan that she will have to come back when his boss is here. Jan is upset with Sam and says she'll go to another store for her paint.



EFF Work Readiness Profile Task Allocate Resources: Use basic math well enough to get the job done.



- 1. Why was Jan upset with Sam?
- 2. What additional information did Sam need to determine how much paint Jan needed?
- 3. What could have Sam done to make sure that he sold Jan the correct amount of paint?
- 4. How do you use formulas at home or in your job?



<sup>66</sup>Alot of our students will do work for people and they don't know how to estimate, to give a price." They say, "I'll do it for \$100." Actually, the job will take them two or three days, so they are only getting paid \$33 dollars a day which winds up to be well under minimum wage. It is important that people be able to build a job estimate."

> Sharlie Jones, Director, Battle Creek Adult Education, Battle Creek, MI (2008)

<sup>CC</sup> Mathematics is important for every order and customer we serve. Estimates are based on cost, profit margin and overhead. Our employees use multiplication to complete the estimate, division to convert linear feet to square feet for pricing, and geometry to determine the square footage of odd shaped projects.

George Prewitt, FASTSIGNS, Traverse City, MI (2008)

#### Vocabulary

Bid • Competition • Cost • Establish • Estimate • Overhead

Percent • Profit • Subtotal • Total

## Scenario 2: Estimating a Job — Richard and José

Richard and José started their own business last year. Their company, Better Built Sheds, builds storage sheds in the area. Richard and José had difficulty figuring out how much to charge when they first started. They lost money on the first sheds that they built for their customers. Richard and José spent time planning how much each part of the shed cost so that they would make a profit instead of continuing to lose money. Estimating the cost of building a quality shed required lots of time. However, Richard and José came up with a chart to use when creating a bid. After using the chart for the past six months, Richard and José have found that they are now making a profit and still beating out the competition.

A local builder has seen the sheds built by Richard and José. He wants the Better Built Sheds Company to send in a bid for twenty (20) sheds. Richard and José know that they will need to hire additional workers in order to provide the builder with the sheds in a timely manner. However, they still want to make a profit instead of just breaking even. They want to establish their bid on a 10 percent profit.





#### **EFF Work Readiness Profile Task**

Allocate Resources: Use basic math well enough to get the job done. Make sure that materials, tools, and equipment are available to do the job effectively.



The table below lists the items that Richard and José use in their cost estimate. Richard and José know that:

- Each shed uses 400 square feet of plywood siding and framing materials.
- Each shed uses 100 square feet of roofing.
- 20 bags of cement are needed for each unit.
- 4 gallons of paint are needed for each coat of paint used on the building.
- Hardware cost is 20% of the cost of the other materials.
- It takes two working days (8 hours per day) for two people to build one shed.

Description	Unit of Measurement	Cost/Unit	Quantity	Cost
Plywood siding and framing materials	Square foot	\$1.25		\$
Roofing	Square foot	\$2.50		\$
Concrete	Bag	\$5.00		\$
Paint (two coats)	Gallon	\$35.00		\$
Door and windows	Per unit	\$225.00		\$
Subtotal				\$
Hardware/Materials	% of Materials	20%		\$
Labor	Hour	\$20.00 per worker		\$
Total Cost				\$
Overhead/Profit	% of Total Cost	10%		\$
Total Bid Cost for 1 Storage Unit				\$

- 1. What types of jobs require that a person complete a job estimate?
- 2. Did Richard and José include the necessary information to make a job estimate? Why or why not?
- 3. How do you use estimation in your daily life?
- 4. Using the information in the scenario, complete the chart to estimate how much 50 storage units would cost.



 $^{\rm cc}B$  oth the shopper and the employee need to know how to figure percentage, and also how to look at a price and estimate whether the item is correctly marked or not."

Marianne Nickels, Hazel Park Adult Education, Holly, MI (2008)

<sup>66</sup> In a previous position, when the company moved to a computerized system, our employees were asked to enter an equation into the cell of a spreadsheet, versus simply entering a number in the cell. Those employees that understood "Order of Operations" were able to achieve accurate results and had a better understanding of what the spreadsheet represented."

Ann Pearsall, Quantum Sail Design Group, Traverse City, MI (2008)

#### Vocabulary

Cost • Mark-up • Package cost • Percentages • Shipment • Stocking

#### Scenario 3: Figuring Mark-Ups — Cynthia

Cynthia works in the stocking department of the local grocery store. Prices are constantly changing, so she is currently setting the prices for new items. The store has just received a new shipment of luncheon meats. Cynthia knows that the case-cost of the luncheon meat is \$24 per 12 (8 ounce) packages. The store must pay the warehouse the cost of the luncheon meat plus their mark-up price. The warehouse markup is 7%. The store mark-up will be an additional 38% above the warehouse total price to their store.

Cynthia has never liked math, but now she is constantly working with percentages. At first she made some mistakes. Cynthia just added the warehouse mark-up and store markup together. Cynthia thought that would make the job easier. However, her boss said that she was losing the store money on every item. Her boss showed her that it made a difference. Cynthia was glad her boss took the time to show her how to do pricing correctly. It takes time to figure out prices and requires many different steps, but the job is worth it!



#### **EFF Work Readiness Profile Task**

Allocate Resources: Use basic math well enough to get the job done.

Solve Problems: Cope with a work situation or tasks that change frequently.



Package cost:	
\$24.00 ÷ 12 (8 ounce) pa	ckages
Warehouse mark-up:	
package cost (	) x .07
Cost from warehouse:	
package cost (	) + warehouse mark-up ( )
Store mark-up:	
cost from the warehouse	e () x .38
Customer Price:	
package cost (	) + warehouse mark-up () + store mark-up ()

- "Every penny counts" is a common saying. Why should Cynthia be concerned if she only makes a mistake that costs the company a penny for each package of luncheon meat?
- 2. What types of mark-ups do you see in your workplace or daily life?
- 3. Why is it important to know how to figure percentages?
- 4. Using the information in the scenario, compute the final cost of one package of luncheon meat. Fill in the blanks to figure out the final cost that Cynthia will mark on each package of luncheon meat. Make sure to read carefully and do one step at a time.



<sup>66</sup> I find it interesting that we can hire someone for that entry-level position at the bank and then at the end of their two-week pay period they don't know how to add up their time cards because we require that it be rounded to the nearest quarter hour. If they work 7 hours and 14 minutes, they don't know how to figure out that simple equation. I realize they are counting out all of that money and I think . . . people may be able to count, but they do not have skills as simple as rounding fractions to the nearest quarter."

Debbie Hansen, Oxford Bank, Auburn Hills, MI (2008)

#### Vocabulary

Overtime hours • Regular hours • Time card

#### Scenario 4: Keeping Track of Hours — Pierre

As an employee at the Battle Creek Nursery, Pierre is paid for each hour worked. Pierre must complete a time card to keep track of his information. The time card keeps track of the total hours that Pierre works, less any breaks, such as lunch. On the time card, normal work hours are called "regular hours." Hours worked in addition to regular hours are called "overtime hours." Pierre is pleased when he gets overtime hours, as he is paid one and one-half times his regular salary.

Each day that Pierre works, he must sign in and sign out. Pierre takes an hour lunch break, so he has to sign in and out both in the morning and in the afternoon. At the end of each day, he totals the number of hours that he has worked for that day. If Pierre works a part of an hour, he must figure his time to the nearest quarter hour. The company's rules are that employees must work 8 minutes or more of a quarter of an hour in order to be paid. So if Pierre works 7 hours and 8 minutes, he would document his time as 7.25 hours. If Pierre works 7 hours and 7 minutes, he would then claim only 7 hours on his time card. Last week, Pierre went to his boss regarding his time card. Pierre told his boss that he had not been paid for the correct number of hours that he worked. Pierre told his boss that he should

receive three hours of overtime pay. Pierre's boss looked at the time card. He told Pierre that the paycheck was correct. The time card showed that Pierre worked a 40-hour week with no overtime.

Check Pierre's time card to see where he made his error in figuring his weekly pay.



#### **EFF Work Readiness Profile Task**

Allocate Resources: Use basic math well enough to get the job done.

Solve Problems: Identify actual or potential problems related to one's own work; help to fix them.



	A.M.	A.M.	P.M.	P.M.	Total Hours
	IN	OUT	IN	OUT	
Mon	7:00	11:45	12:45	4:00	7.0
Tues	7:00	11:45	12:45	4:19	8.5
Wed	7:00	11:32	1:56	4:00	8.0
Thurs	7:04	11:49	1:25	3:35	8.0
Fri	7:08	11:15	12:45	3:52	7.25
Sat	7:00	10:07			4.25
Sun					
				Regular Hours	40.0
				Overtime Hours	3.0
				Total Hours	43.0

- 1. Why does a company need to keep a record of hours worked?
- 2. What is the purpose of a daily log?
- 3. Why should Pierre check with his boss if his paycheck does not match his personal time log?



"When I get together with the caregivers who work with me it is hard for them to distinguish between an 1800 calorie ADA diabetic diet and 2200 ADA calorie diet. It helps if I send out my dietician to teach them the difference in portions. The main reason for increase in blood sugar is the food you eat."

Teberch Alexander, Compassionate Home Care, Detroit, MI (2008)

#### Vocabulary

Carbohydrates • Compliments • Dietary • Nutritionist Nutritional label • Portions• Resident • Sodium • Standards

#### Scenario 5: How Many Calories? - Felicia

Felicia works as a nutritional assistant in a local nursing home. She assists in the meal planning for the residents. It is important that the meals that are served are nutritious and meet the dietary needs of the residents.

It is recommended that the meals served have no more than 40% of their calories from total fat and about 50% of their calories from total carbohydrates (neither too high, nor too low). The nutritionist also has suggested that any new items be low in sodium.

Felicia knows that the residents like macaroni and cheese. She wants to put a new brand of macaroni and cheese on the menu. The residents don't like the current brand. Felicia is looking at the label to see if the new product meets the standards set by the nutritionist. Felicia sees that the serving size is 1 cup, which sounds good. Many of the residents do not eat large portions. Felicia looks at the label to see how many of the calories come from fat and carbohydrates. She is confused by the figures on the nutritional label. Felicia calls the nutritionist to review the information on the label.

The nutritionist compliments Felicia on looking for new menu items. She tells Felicia that she should continue to look for a different product as this one does not meet the set standards.



#### **EFF Work Readiness Profile Task**

Allocate Resources: Use basic math well enough to get the job done. Make sure that materials, tools, and equipment are available to do the job effectively.

Solve Problems: Cope with a work situation or tasks that change frequently. Demonstrate flexibility; accept new or changed work responsibilities with a positive attitude; adjust to unexpected problems and situations by seeking advice from a supervisor or appropriate others.



# **Nutrition Facts**

Serving Size 1 cup (228g) Servings Per Container 2

Amount Per Servi	ng		
Calories 250		Calories fr	om Fat 110
		% Da	aily Value*
Total Fat 12g			18 %
Saturated Fa	at 3g		15 %
Trans Fat 3g			
Cholesterol 30m	ng		10 %
Sodium 470mg			<b>20</b> %
Total Carbohyd	r <b>ate</b> 31g		10 %
Dietary Fibe	er Og		0 %
Sugars 5g			
Protein 5g			
Vitamin A			4%
Vitamin C			2 %
Calcium			20 %
Iron			4 %
* Percent Daily Va Your Daily Value	lues are based s may be high ds.	on a 2,000 ca er or lower de	alorie diet. epending on
, sa. calone nee	Calories	2,000	2,500
Total Fat	Less than	65g	80a
		5	eeg

Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300g
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate	300g	375g	
Dietary Fiber	25g	30g	
·	-	-	

- 1. Why did Felicia want to add new food items to the menu?
- 2. What steps did Felicia take to make sure that the macaroni and cheese met the standards set by the nutritionist?
- 3. What math skills did Felicia and the nutritionist use to evaluate the content of the macaroni and cheese?
- 4. What potential health problems can be caused by not reading nutritional labels?



<sup>66</sup> It is sometimes difficult to understand one's check stub, especially when one starts with a certain amount of money and then there are withdrawals for more than just taxes. There may be insurance, union dues ...it makes it difficult to figure out how much money one will really receive."

Sharlie Jones, Battle Creek Adult Education, Battle Creek, MI (2008)

#### Vocabulary

Budget • FICA • Net pay • Registered nurse • State MI

## Scenario 6: Where Did My Money Go?— Zora

Zora is excited about her new job at Mt. Pleasant Hospital. She is a registered nurse and is working on the children's floor at the hospital. Zora worked hard to get her nursing degree. She knows that it takes a good income to be able to support herself and her daughter.

When Zora was offered \$29 an hour and a full-time job, she was thrilled. She made her monthly budget and was pleased that she would be able to pay all of her bills. However, when she received her first paycheck, she was very upset. Instead of being paid \$1,160, which she had counted on, she only made \$844. Where did the rest of her money go? Zora is definitely going to have to redo her budget.



#### **EFF Work Readiness Profile Task**

Allocate Resources: Use basic math well enough to get the job done.

Solve Problems: Identify actual or potential problems related to one's own work; report them in a timely manner, according to company policy; help to fix them.

Rate/Salary 29.00 Date Paid 3/1/08 Period Begin 2/11/08 Period Ending 2/17/08 Department Pediatrics						
Earnings	Hours	Current	Year-to-Date	Deductions	Current	Year-to-Date
REG HOLIDAY TOTAL PAY	40.00 00.00 40.00	1,160.00 00.00 1,160.00	1,160.00 00.00 1,160.00	FICA-OASDI Federal FICA-HI STATE MI NET PAY	71.92 178.30 16.82 48.92 844.04	71.92 178.30 16.82 48.92 844.04



- 1. What are state and federal paycheck deductions for?
- 2. Why are these deductions taken from a person's check?
- 3. What are some other paycheck deductions that many employees have to pay?
- 4. Why are the current and year-to-date amounts the same?
- 5. Zora's Net Pay (take home) is \$844.04. Estimate what percentage of her \$1,160 was taken in deductions.
- 6. A personal budget is based on take-home pay. Where did Zora go wrong? How can she plan better next time?



"The relationship between math functions and the budget, it doesn't happen. When I was a kid, there was a family where the dad worked for GM. When he got his paycheck, it would be steak, steak, steak four times, and then the next week it would be pork chops, then ground beef, fish sticks, then noodles, and then payday. They didn't see the connection between the paycheck and where it was going. They knew the beginning of the first week they had steak and at the end of the last week they had noodles."

Bob Chlebnik, Brown's Do It Best Hardware, Goodrich, MI (2008)

## Vocabulary

Budget • Convenience store • Emergency • Expensive • Fixed expense • Flexible expense • Installment payment • Toiletries

## Scenario 7: Budgeting a Paycheck — Edward

Edward has been working at the same job for over a year. He is working hard to make his monthly bill payments, so he started a part-time job on the weekends at a convenience store. Edward wants to open a savings account and deposit \$25 a month from his paycheck. He knows that having a savings account is necessary in case he has an emergency and needs extra money. However, he just has not gotten around to creating a monthly budget.

Edward does not regularly buy new clothes or things for the house. He is also very lucky that he has not been sick. He doesn't have insurance at work and knows that doctors can be expensive. Edward knows that he wastes much of his monthly income on going out with his friends after work. Some of that money could be used to start a savings account. Edward knows that would be a wise thing to do. Although Edward makes \$1,710 a month, he always ends up with no money left at the end of the month. Edward really wants to create a budget that works.

#### **Think About It!**

 Edward enjoys going out with his friends and does not want to put all of his extra earnings into a savings account. How much would you suggest that Edward save each month and still be able to go out with his friends? How can Edward figure out exactly how he is spending his money?



#### EFF Work Readiness Profile Task

Allocate Resources: Use basic math well enough to get the job done.

Solve Problems: Cope with a work situation or tasks that change frequently.



- 2. Why is a savings account an important part of one's budget?
- 3. What types of expenses would you decrease in order to start a savings account? Why?
- Help Edward budget his monthly expenses and figure out how much money he can put in his savings account. Use the following information to complete Edward's budget form:

Edward's monthly income from Job #1 is \$1,345 and from Job #2 is \$365.

Edward has the following monthly expenses: Rent payment of \$575 Car payment of \$165 Car insurance of \$50 Minimum credit card payment of \$25 Food cost of \$125 Utilities of \$135 Car expenses of \$120 Personal expenses of \$55 Entertainment expenses of \$95



## Edward's Monthly Budget Worksheet

Income	
Job #1	
Job #2	
Other	
Total Income	
Fixed Expenses	
Rent	
Car Insurance	
Other	
Total Fixed Expenses	
Installment Payments	
Credit Card #1	
Credit Card #2	
Car Loan Payment	
Total Installment Debt	
Flexible Expenses	
Food	
Utilities (gas, electricity, water)	
Car Expenses (gas, oil, tolls, repairs)	
Clothing	
Personal Items (toiletries)	
Medical	
Household Items	
Entertainment	
Total Flexible Expenses	

Edward's income	minus Edward's expenses	(Fixed Expenses +

Installment payments + Flexible expenses) = Money remaining \_\_\_\_\_.





#### **EFF Work Readiness Profile Task**

Allocate Resources: Use basic math well enough to get the job done.

Solve Problems: Cope with a work situation or tasks that change frequently; adjust to unexpected problems and situations by seeking advice from a supervisor or appropriate others. "Estimating is an important skill. I go to the grocery store and have Ea good idea about what I need to pay when I get to the check-out counter so I don't wind up short. There are thousands of things you can estimate: your groceries, the size of a room, how long tools will last, the amount of percentages. Good estimation skills are so important for the workplace."

Gary Tweddle, Hazel Park Adult Education, Hazel Park, MI (2008)

#### Vocabulary

Commission • Disappointed • Estimation • Purchases

## Scenario 8: Figuring Commission — Maria

Maria has just been hired as a sales clerk in a large department store. She is excited about her new job. She will be making a weekly salary of \$200. In addition, she will receive 5% of her sales total during the week. Maria knows that she needs to make at least \$300 a week to pay her bills. She is sure that she will be able to make more than \$100 a week from her sales commission. Maria is very disappointed when her first check arrives. She only made \$250, not enough to pay her bills. Maria wants to keep track of her commission so that she makes \$300 on her next paycheck. Maria talks with her supervisor about how much she will need to sell. She is surprised that she will need to sell at least \$2,000 in purchases. How can that be?

Maria's boss asks her if she estimated her sales commission. Maria does not know how to use estimation. Maria's boss tells her that she can do the math in her head by using estimation. All she needs to do is round her sales to the nearest hundred dollars and multiply by 5%. Maria's boss gives her the following sales numbers and has her practice estimating her commission:

#### \$3,238.98 \$2,198.76 \$1,548.98

Maria finds it easy to multiply numbers like \$1500 by 5 in her head. In fact, Maria has an even easier way to figure out 5% of her sales. She multiplies by 10% and then takes half of that number. For example if Maria's sales are \$2,100, she knows that 10% is \$210 and half of that is \$105. Maria is excited about her new skill in estimating. She is looking forward to using her new estimation skills when she shops. It's almost like a game!



- 1. How do you use estimation skills in your workplace or community?
- 2 What are different ways that you estimate?
- 3. How could you use estimation when shopping for groceries so that you have enough cash to pay for your purchases?





#### **EFF Work Readiness Profile Task**

Allocate Resources: Use basic math well enough to get the job done. Make sure that materials, tools, and equipment are available to do the job effectively.

Solve Problems: Cope with a work situation or tasks that change frequently. Demonstrate flexibility; accept new or changed work responsibilities with a positive attitude; adjust to unexpected problems and situations by seeking advice from a supervisor or appropriate others. <sup>66</sup> I want to make a point on what can you do to help employers with new employees. I know it's really important for every employee coming into an entry-level position to understand that each part that they throw away is money not in our pocket. If they can find that defect in the molded part and we can regrind that part and reuse the material it is so important to do that, Whether it's the company's money, the worker's bonuses, or their raises, a salvaged part helps us all."

Ruthann Ferris, LACKS Industries, Grand Rapids, MI (2008)

## Vocabulary

Centimeters • Incorrectly • Measurements• Specifications • Tubing

## Scenario 9: It's About Metrics — Jana and Demetri

Jana and Demetri work for Master Tubing Company. Their job is to cut metal tubing to specifications. They take long metal tubes and put them through a machine. Sometimes the length specifications change dependent on the contract. Jana and Demetri are responsible for making sure that they cut the tubing a certain length so that it can be delivered to the manufacturing plant.

Jana and Demetri must be very exact with their measurements. If they cut incorrectly, they end up costing the company money. Incorrectly cut tubing must be scrapped or thrown away. Their friend Helen is currently laid off for three days without pay. She wasn't paying attention when she measured and ran 4,000 tubes that were cut too short. Jana and Demetri are paying careful attention so that they do not measure incorrectly.

Use a metric ruler to check their work on the following page and see if the tubes that they have run are measured to specifications.



#### Be sure to measure the front "side" of the tube, not the entire "tube illustration." For example:



- Why was Helen laid off without pay? Was that fair of the employer? Why or why not?
- 2. Why is accuracy such an important skill in a factory position? How does scrap influence profit?
- 3. What other careers need measurement skills?





#### **EFF Work Readiness Profile Task**

Allocate Resources: Use basic math well enough to get the job done.

Solve Problems: Cope with a work situation or tasks that change frequently; demonstrate flexibility. <sup>66</sup> It seems to me that we academically place such a heavy emphasis on algebra and geometry that our students don't always have the basics for them to build upon. What about decimals? Decimals are an important part of the workplace. I wonder how really well-versed people are in this particular area of basic math."

David Porter, Detroit Public Schools (Retired), Detroit, MI (2008)

#### Vocabulary

Accurate • Calculation • Mileage • Reimbursed • Representative Tool and die

## Scenario 10: Using Decimals and Charts to Figure Mileage — Pedro

Pedro has been hired as a sales representative for a national tool and die company. His office is based in Detroit, but his job requires a lot of travel each month. In order to be reimbursed for his mileage, he must submit an expense report. He is reimbursed \$0.38 (38 cents) for each mile he drives. Gas has become very expensive, so Pedro tries to keep up with his mileage form. He knows that it is important for him to be accurate in his calculation. The company has given him a chart to use. The chart gives Pedro one-way mileage to a location. He must double that number in order to be paid for driving to and from a city.

Pedro is working on his April mileage reimbursement. He spent many miles on the road. Help him track his miles by completing the form for him. Remember, Pedro starts each day in Detroit at his office.

## **Detroit Book Company Mileage Chart**

Detroit											
57	Flint										
148	107	Grand Rapids									
72	82	100	Jackson								
134	126	51	64	Kalamazoo							
84	51	66	39	75		Lansing					
184	143	39	136	84	102		Muskegon				
32	66	168	104	166	104	204	New Haven				
25	32	134	81	142	70	170	34	34 Pontiac			
103	46	61	61	92	22	100	112	78 St Johns			
132	75	152	142	186	111	168	138	107	7 98 Standish		
29	61	134	43	105	70	170	61	41	92	135	Ypsilanti



SUN	MON	TUES	WED	THURS	FRI	SAT
	<b>1</b> Lansing	<b>2</b> Flint	3	<b>4</b> Grand Rapids	5	6
7	<b>8</b> Jackson	<b>9</b> Standish	10	<b>11</b> Pontiac	12	13
14	15	<b>16</b> Muskegon	17	<b>18</b> Kalamazoo	19	20
21	<b>22</b> New Haven	<b>23</b> Muskegon	24	<b>25</b> St. Johns	26	27
28	<b>28</b> Ypsilanti	<b>30</b> Standish	31			

Complete the following Mileage form for Pedro:

Name: Heado	: Pedro Jones <b>Juarters:</b> Detroit	Social Security Number: 000-00-0000 Dates of Travel: 3/1 – 3/31/08					
Date	Destinat	ion	Number of Miles round trip	Cost per Mile	Total		
			Total M	ileage Cost			

- 1. Why is it important for Pedro to send in his mileage forms on time?
- 2. What math skills does Pedro need to complete a monthly mileage form?
- 3. What would you do as a boss if Pedro completes his mileage forms incorrectly each month?



<sup>66</sup> It's important that people understand basic math, whether they're starting their own business or just needing to understand how people get paid in the company for which they work. Sometimes it helps if employees understand how they are going to help the employer get paid for what is done. It helps the employees value the process a little more so they understand that what they get paid is appropriate."

Mike Vincent, Director of Training, Macomb-Oakland Regional Center, Inc., Auburn Hills, MI (2008)

#### Vocabulary

Electrical • Formula • Invoice • Hourly rate • Table

## Scenario 11: Using Formulas and Charts to Bill Customers Correctly— Gil and Madge

Gil owns an electrical company in Traverse City. He has recently hired a new secretary to help in the office. Madge is learning how to invoice for jobs completed by the electricians. Every time an electrician is hired, it costs the customer \$50 for the house call. The total bill, however, depends on the number of hours the electrician is on the job. The hourly rate for an electrician is \$30. Madge is having difficulty in billing the correct amount. Gil tells her that he has developed a table for her to use. The table shows how the cost to the customer depends on the number of hours the electrician works on the job.

Madge is very pleased to have the table. It helps her to get the invoicing correct. However, Gil has only included a maximum of 3 hours of an electrician's time. Madge knows that she has bills where electricians have spent the whole day at one place. Madge wants to complete the table that her boss has given her so that she does not make any invoicing mistakes.

M. Vincent

EFF Work Readiness Profile Task Allocate Resources:

Use basic math well enough to get the job done.

Solve Problems: Identify actual or potential problems related to one's own work; help to fix them.

Hours	Formula	Cost
1	50 + 30 x 1	\$80
2	50 + 30 x 2	\$110
3	50 + 30 x 3	\$140
4	50 + 30 x 4	\$
5	50 + 30 x 5	\$
6	50 + 30 x 6	\$
7	50 + 30 x 7	\$
8	50 + 30 x 8	\$
		A

Help Madge by completing the following table.



- 1. Why would Madge want to expand the table her boss created?
- 2. How can a table or chart help people in the workplace?
- 3. When do you use tables or charts in your workplace or at home?



<sup>66</sup> Many cashiers who work with money all day long at a cash register in a grocery store are totally reliant on that cash register machine to make change for them. They don't understand how to make change or break down prices for the customer. It's a very scary situation."

Dianne Duthie, State Director of Adult Education, Lansing, MI (2008)

## Vocabulary

Change • Computerized • Customer • Manager • Restaurant • Till

## Scenario 12: The Computers Are Down! Counting Change— Miguel

Miguel is the manager of a fast food restaurant in Kalamazoo. The restaurant is very popular and stays busy. Miguel has just recently purchased a new computerized cash register. The cash register allows the workers to touch pictures on the screen to complete an order. The new machine also tells the workers how much change to give the customers. Since Miguel put the new system into his store, he has had few problems with customers receiving incorrect change.

Last week, a bad storm caused the cash register to stop working. Miguel was upset. However, he told his workers that they could just figure the customers' change themselves. Soon, Miguel had many customers who were upset. The workers were giving them the wrong change. Miguel watched his workers. It was evident that they did not know how to make change. One customer gave a worker a ten-dollar bill and seven pennies for a meal that cost \$8.57. The worker gave the customer two dollars in change. Miguel didn't know what to do. Customers were upset and Miguel knew that his till definitely would not balance at the end of the day.

## **Think About It!**

- 1. If you were Miguel, what would you do in this situation?
- 2. Why didn't Miguel close his restaurant?
- 3. Do you think that people should have to prove that they can complete basic math skills before they are hired at an entry-level job? Why or why not?



#### **EFF Work Readiness Profile Task**

Allocate Resources: Use basic math well enough to get the job done.

Solve Problems: Identify actual or potential problems related to one's own work; report them in a timely manner, according to company policy; help to fix them.





EFF Work Readiness Profile Task Solve Problems: Identify actual or potential problems related to one's own work.

Use Systems: Understand systems; Comply with organizational policies and procedures in a consistent manner. <sup>66</sup> In the furnace area where we actually melt the metal it is not exactly like cooking at home but it is a recipe. We might have 2000 pounds in the furnace or 5000 pounds, so the operator needs to be able to understand how many additives or alloys are needed for 2000 lbs versus 5000 lbs. You may have to add additional flour or sugar to a recipe if you have more guests, so the understanding of that principle is the same here. It's like a recipe; any cook needs to know the math."

John Workman, Eagle Alloy, Inc., Muskegon, MI (2008)

#### Vocabulary

Compound • Request • Chaperon • Band concert • Neighboring

## Scenario 13: Students and Chaperons — Juanita

Juanita works at Bob's Bus Compound. Today she had a request from a local high school to transport band students from the school to a band concert in the neighboring town. The school has requested 7 buses for 360 students plus their chaperons.

Bob's Bus Compound knows the school requires 1 chaperon per 20 students. Juanita wants to make sure that 7 buses will be enough for the 360 students and the chaperons. She knows that 4 buses can transport 220 people, but she is not sure how many people can ride in 7 buses.

- 1. How many people will 7 buses be able to transport?
- 2. How many chaperons are needed?
- 3. Are 7 buses enough for 360 students and the chaperons?
- 4. Is this a good way to transport the students and the chaperons?
- 5. Do you think that 1 chaperon per 20 students is enough chaperons?



<sup>66</sup> In our machine shop we actually give a math test to every entry-level person. It's a very basic test- add, subtract, multiply, divide and decimals. We require a high school diploma. Even the entry-level folks in the cleaning room are required to know division and multiplication and how to figure out percentages. They have to figure out their performances every day. We call it their score sheet. As far as the calculator goes, we actually have them on a board with Velcro in the workplace so folks can use them when they are figuring out their performances every day."

John Workman, Eagle Alloy, Inc., Muskegon, MI (2008)

#### Vocabulary

Auto mechanic • Customer • Gross pay • Percent

## Scenario 14: Raise percent — Josh

Josh works as an auto mechanic for Phil's Auto Repair. His boss knows he is a hard worker. Phil, his boss, told Josh he was getting a raise. Until now, Josh's pay was 10% of the customer's bill. This made it easy for Josh to figure out what he would be paid at the end of the week.

He receives his paycheck on Friday. The boss never told him what his raise would be. Josh always keeps track of how much each customer is charged. He writes it down on his weekly schedule. This way he knows on a daily basis the total amount charged to all of his customers. At the end of the week he adds his daily totals to find out his weekly total. His gross pay for this week is \$825. He knows he received a raise, but now he is not sure how much.



EFF Work Readiness Profile Task Solve Problems: Identify actual or potential problems related to one's own work.

Responsibility: Take responsibility for completing one's own work assignments accurately, on time, to a high standard of quality.

	Monday	Tuesday	Wednesday	Thursday	Friday	Weekly Total
	\$789	\$565	\$763	\$698	\$608	
	\$130	\$349	\$847	\$956	\$140	
		\$243	\$354	\$23	\$83	
		\$78	\$249			
Daily Total						



- 1. What was the daily total amount charged to Josh's customers? What was his weekly total?
- 2. If he had not received the raise this week, what would be the gross amount of his paycheck?
- 3. What is the new percentage that Josh will be paid?
- 4. Is being paid by a percentage a good way to be paid?


<sup>66</sup>Once, at a fabric store, I purchased three items and the most expensive one was \$2. If the charge was for the most expensive price of those three things the total couldn't be more than \$6. When the clerk gave me a total of \$28.50, I said I am sorry you are wrong. She argued with me that she wasn't wrong. She wasn't very gracious about it, but in the end did give me the right price for my items."

> Claudia Murch, Southern Michigan Bank and Trust, Battle Creek, MI (2008)

### Vocabulary

Department store • Receipt • Cash register • Computerized

## Scenario 15: Figuring a Sale Price — Eduardo

Eduardo works in a department store as a clerk in the men's department. A customer comes in to return a pair of pants that were purchased three weeks ago. The customer does not have the sale's receipt, but the price tag of \$54.99 is still on the pants. However, the pants are now on sale for 35% off. Eduardo explains he cannot refund the amount on the price tag without a receipt. He can only give the customer the sale price.

The computerized cash register is not working, and Eduardo has to figure out how much money is needed for the return. He gives the customer \$19.25. The customer says that is not correct. Eduardo insists that it is the correct change. The customer goes to find the floor manager.

## **Think About It!**

- What happens when technology (the computerized cash register) does not work at a business that depends on cash sales being correct?
- 2. Should a business shut down when the computers do not work correctly?
- 3. Did Eduardo give the customer the correct change? If not, what should have been the correct change?
- 4. What skills should an employee have in order to work with receiving money and then having to figure out the correct change?



EFF Work Readiness Profile Task Solve Problems: Identify actual or potential problems related to one's own work.

Work With Others: Serve clients; address customer comments, questions, concerns and objections with direct, accurate and timely responses.





Solve Problems: Cope with a work situation or tasks that change frequently; accept new or changed work responsibilities with a positive attitude; adjust to unexpected problems and situations by seeking advice from a supervisor or appropriate others. Identify actual or potential problems related to one's own work. <sup>66</sup> Let's suppose that a person has the opportunity to choose between two jobs. One is going to pay the person \$9 an hour with medical benefits and three weeks' vacation. The other job tells the potential employee that they are going to offer \$13 an hour, but they don't have any benefits. What type of knowledge does the person need to determine which job would be best for the present and for the long term?"

Marianne Nickels, Hazel Park Adult Education and Past Co-Owner of Nickels Boat Works, Inc., Fenton, MI (2008)

#### Vocabulary

Application • Benefits • Cons • Interview • Manufacturing • Options • Pros

# Scenario 16: Which Job Should I Take? Decisions, Decisions! — Trish

Trish is a mother of two school-aged children. Her husband, Dave, was recently laid off from the manufacturing plant in Dearborn. Dave has been looking for another job. He has not been successful yet.

Trish has decided to go back to work. After completing many job applications and going on many interviews, she has just received two job offers! The first job is with a small company in Dearborn. The job is offering a starting salary of \$9 per hour for a 40-hour work week. The Dearborn job also provides medical benefits and three weeks of paid vacation. The second job offer is with a large company in Detroit. This company is offering Trish \$13 an hour. The Detroit company tells Trish that she can make overtime if she works over 40 hours a week. The large company does not offer benefits.

Trish needs to consider her options. The family car is not very reliable. Driving 40 miles a day could be a problem. However, Trish likes the idea of making more money an hour with the possibility of overtime. Although she may start part-time, Trish is sure she can work 40 hours a week.

The job in Dearborn is much closer to home. This job has good benefits. Trish knows that medical care is expensive. Her family has no medical insurance.

Trish and John talk about the pros and cons of each job. Which job should Trish choose?



- 1. What are the pros of the Detroit job? What are the pros of the Dearborn job?
- 2. What are the cons of the Detroit job? What are the cons of the Dearborn job?
- 3. Which job do you think Trish should take? Why? Is it worth it to drive to Detroit for \$160 per week more?





Allocate Resources: Use basic math well enough to get the job done.

Solve Problems: Identify actual or potential problems related to one's own work. "As you think about young people going into the workplace, I can remember talking with my students about the deductions from their paychecks – social security, taxes, etc. One said, 'they are not taking taxes out of my check!' Many young people think if they make a couple hundred dollars a week that they are rich. They have no idea about all of the deductions that come out of a paycheck or the unseen expenses that pop up in real life."

Marianne Nickels, Hazel Park Adult Education and Past Co-Owner of Nickels Boat Works, Inc., Fenton, MI (2008)

#### Vocabulary

Frustrated • Interest • Internal Revenue Services (IRS) • Loan Taxes

## Scenario 17: A Taxing Situation — Felix

Felix is an excellent automotive mechanic. He works at a busy auto repair shop in Auburn Hills. Felix is looking at his yearly income. He recently got a big raise. However, Felix knows that his taxes will also go up. Felix had to pay extra money last year to the Internal Revenue Service (IRS). His boss had not taken enough income tax out of his paycheck. Felix had to get a loan from the bank to pay the extra taxes. This cost Felix money in interest. Felix is still paying the loan for last year's taxes. He is very frustrated that this happened. Felix does not want this to happen again this year.

Felix's boss said he should always check how much he needs to pay in taxes each year. Felix's boss gives him the following chart to use. It tells Felix how much he will owe in taxes based on his yearly income.

Felix knows that he makes \$3,250 a month before taxes are taken out of his check. Felix knows that to get his annual salary, he will need to multiply his monthly paycheck by 12. He looks at the chart and sees that he will pay \$3,862.50 in taxes plus 28% of everything he makes over \$25,750. Help Felix figure out exactly how much tax he will owe based on his salary.



lf your income is over	But not over	Your tax is:	Of the amount over
\$0	\$25,750	15%	\$0
\$25,750	\$62,450	3,862.50 + 28%	\$25,750
\$62,450	\$130,250	14,138.50 + 31%	\$62,450
\$130,250	\$283,150	35,156.50 + 36%	\$130,250
\$283,150		\$90,200.50 + 39.6%	\$283,150

- 1. What types of items come out of a paycheck?
- 2. Why is it important to know what a workplace takes out of a person's paycheck?
- 3. What tax amount would Felix pay based on his yearly salary?
- 4. Where can you find information on tax rates?





Allocate Resources: Use basic math well enough to get the job done.

Solve Problems: Identify actual or potential problems related to one's own work. <sup>66</sup> I work with a telecommunication company that wanted to reduce the waste in cabling. The men would simply go out to the job site and pull a roll of cable and start running their cable and when they needed other cabling they would simply go to the back of the truck and again pull some more and measure what was needed. A young worker was asked for ideas to reduce waste and improve productivity. Instead of constantly pulling out his tape measure the young man just simply said I look at fixed objects when we know the measurement between Point A and Point B. I count tiles on the floor, and every tile is 12 inches so I am able to use fixed objects to measure, saving material and time. He had to teach the older workers this trick."

Nate Capellupo, Michigan Works!, Traverse City, MI (2008)

### Vocabulary

Production chart • Supervisor • Workstation

## Scenario 18: Efficiency — Roberto

Roberto is a supervisor at the Kalamazoo Paper Mill. It is his job to make sure that each workstation is operating well. In the past six months, Roberto has noticed that his workstations are producing less paper. He is not sure why this is happening. In fact, one of Roberto's teams got bonuses last month for having the highest production in the company.

Roberto talks with his workers. He asks them whether or not they are having any problems. They all tell Roberto that they are working hard. The teams do not see that there are any problems. Roberto decides to check on each team's work. He asks his supervisor to give him a production chart for each workstation. Roberto is surprised at what he sees. Three of his workstations are producing well. However, Roberto has one workstation that is very low. He will need to work with these workers to find out what is going on.





- 1. How did the workstation graph help Roberto identify the problem?
- 2. Why is it important to be able to read graphs and charts?
- 3. How do you use graphs and charts in your workplace or daily life?





Allocate Resources: Use basic math well enough to get the job done.

Solve Problems: Identify actual or potential problems related to one's own work. <sup>66</sup> I think the greatest challenge for all US manufacturers is lean manufacturing or lean enterprise. This means that you have to continuously improve and people need to be working on problem solving all the time. If you have people who have limited capability in math, your ability, as a team or as a company, to accomplish a return on investment is limited. So, to me, it's all about problem solving and continuous improvement. In a global market where you are competing with people all over the world, if your company is not doing this kind of stuff, you are putting yourself in big trouble.

Win Irwin, Irwin Seating Company, Grand Rapids, MI (2008)

#### Vocabulary

Inventory • Partial • Quantity

### Scenario 19: How Many Boxes Do I Need? — Tia

Tia works in the shipping department of the GR Warehouse. She is responsible for filling orders for builders in the area. Sometimes materials are ordered by the builders in different quantities. This makes Tia's job more difficult. It's much easier when a builder wants an even number of items. However, that's not always the way it goes, so Tia ends up having to break up a box of materials. The company works hard to make a good profit. This means that Tia must use partially filled boxes to fill other orders whenever she can.

Fulton Air-Conditioning Company has ordered 122 air filters. Right now, Tia has five partial boxes of the air filters in her inventory. One box has 7 air filters, another one has 3 air filters, and three of the boxes have 4 air filters in each one. A full box has twenty-five filters in it, but Tia wants to use the partial boxes first. She looks at the inventory list and sees that she can fill the order using a limited number of full boxes. Tia is pleased that she will be able to make good use of the partial boxes.

- 1. How many full boxes of air filters did Tia need to use to fill the builder's order?
- 2. Why would a company have partial boxes of a product?
- 3. Why is it important for a company to use partial boxes of a product when filling an order?



<sup>66</sup>O ne major issue I have is the need to understand graphs! Employees need to understand graphs. At LACKS we have efficiency graphs and we have defect graphs. How many defects per shift did we have this month? What is the top defect of the month? The graphs are posted at workstations for employees to see."

Ruthann Ferris, LACKS Enterprises, Grand Rapids, MI (2008)

#### Vocabulary

Temporary • Data processing • Zones • Calendar month

## Scenario 20: Riding the Train — Harriet

Harriet works for All-Star Temp Agency that helps businesses find temporary workers. She does data processing. Sometimes Harriet's jobs are in neighboring towns. For the next two months, Harriet will have to travel at least 62 miles one way to get to one of her jobs. The other job will be over 70 miles away. She decides that she will take the Train-Rail, a local train that will take her to both of her new jobs. She will be picked up at the train station by a person from the business she is doing temporary work for. A co-worker will also take her back to the train station to catch the train home.

On Tuesdays and Thursdays, Harriet will travel by train to get to her temporary work. The train travels back and forth through 6 different zones. This is her first week that she must travel and she wants to make sure she buys the correct ticket.

She knows she will pass through 3 zones on Tuesdays and 2 zones on Thursdays. She has read the directions and is looking at the chart of zones and fares.

Look at the information on the following page from the **Train-Rail** to decide which ticket should be bought.

## **Think About It!**

- 1. Which fare is the best for Harriet?
- 2. How much will it cost her per week?
- 3. Is this better than driving her car to the different destinations?



#### **EFF Work Readiness Profile Task**

Acquire and Use Information: Read and understand information presented in written form well enough to get the job done.

Solve Problems: Identify actual or potential problems related to one's own work.



# Train-Rail

NOTE: Passengers must have a valid ticket prior to boarding the train. Tickets are NOT sold onboard the train.

## Strict Fare Enforcement

Train-Rail strictly enforces its fare policy.

Tickets are available at all Train-Rail stations prior to departure. Tickets are only valid on the day of purchase. Monthly tickets are only valid from the first to the last day of the calendar month. Train-Rail suggests arriving at the station 20 minutes prior to departure. All passengers must purchase a valid Train-Rail ticket. Failure to present a valid Train-Rail ticket on trains upon request is a first-degree misdemeanor and may result in a fine from \$50 to \$1,000, arrest, and/or removal from the train, (Train-Rail policy prohibits refunds or replacement of lost or stolen tickets).

# **Calculating our Fare**

The Train-Rail system is comprised of six zones. Weekday ticket prices are determined by the number of zones through which a passenger travels. To determine the number of zones traveled, start at your station of origin (which counts as zone one). The total number of zones passed through (including the zone you arrived in) will determine the cost of your ticket. When purchasing tickets from a Ticket Vending Machine (TVM), your fare is automatically calculated by the TVM. The zone fare chart outlines the available ticket types with corresponding prices by zone.

# Weekend Fares

Train-Rail currently offers discounted flat fares for all weekend/holiday travel. These fares are in effect for travel between all destinations on weekends and holidays only. Transfers from other systems are not applicable to the discounted weekend fare. Weekend fares may be discontinued at any time and do not apply to special service trains.

# **Holiday Service**

Train-Rail operates a Sunday schedule on New Year's Day, Memorial Day Observed, Fourth of July, Labor Day, Thanksgiving Day, and Christmas Day.

NUMBER OF ZONES TRAVELED	ONE WAY	DISCOUNT ONE WAY	ROUND TRIP	DISCOUNT ROUND TRIP	MONTHLY	DISCOUNT MONTHLY
1	\$2.00	*\$1.00	\$3.50	*\$2.00	\$80.00	*\$40.00
2	\$3.00	*\$1.50	\$5.00	*\$3.00	\$80.00	*\$40.00
3	\$4.00	*\$2.00	\$6.75	*\$4.00	\$80.00	*\$40.00
4	\$4.50	*\$2.25	\$7.75	*\$4.50	\$80.00	*\$40.00
5	\$5.00	*\$2.50	\$8.50	*\$5.00	\$80.00	*\$40.00
6	\$5.50	*\$2.75	\$9.25	*\$5.50	\$80.00	*\$40.00



"A tour agency we give clients a mathematics test. One employer we work with said the most common problem is with fractions. The ability to add and subtract is crucial to business. Understanding decimals is another basic math skill."

MJ Bruns, Michigan Works! Marshall, MI (2008)

#### Vocabulary

Remnants • Yardage • Yard • Project

#### Scenario 21: Add Up the Total with Fractions — Marta

Marta works at a fabric store. One of her duties is to measure and cut the fabric for customers. One customer is requesting Marta's help to buy several different remnants to equal 6 yards. The customer wants to complete a project that evening.

So far the customer has selected remnants of 1/2 yard, 2 3/4 yards, 1 2/3 yards and 1/3 yard. The customer asks Marta how much more fabric she will need. Marta adds up the different yardage amounts in her head. She tells the customer that she needs an additional 1/2 yard. The customer finds the 1/2 yard and Marta completes the sale.

The customer comes back the next day and is furious. She was unable to complete the project because she did not have enough fabric.

#### **Think About It!**

- 1. How much more material should the customer have bought?
- 2. What was the result of Marta's mistake?
- 3. What should Marta do the next time she is asked to figure additional yardage needed?
- 4. Is it an employee's job to figure out a customer's problem?



#### **EFF Work Readiness Profile Task**

Allocate Resources: Use basic math well enough to get the job done.





Use Technology: Be able to use a telephone, pager, radio, or other device to handle and process information. "We have had some literacy students who do not know how to write checks or keep a checkbook. This is a skill that requires both reading and mathematics skills. We also sell literacy and English language classes to companies. In every single company whether it's manufacturing, construction, masonry, or healthcare, math is necessary. Many manufacturing companies request we teach their employees how to read work instructions. Most companies have jobs that require math. It's different for each company."

Susan Ledy and Kristin Ekkens, Literacy Center of West Michigan, Grand Rapids, MI (2008)

#### Vocabulary

Delivery • Install • Interstate • Notify

### Scenario 22: Delivery MPH — Jerry

Jerry works for a delivery company. He drives a mid-size truck delivering electrical equipment used to install security alarm systems for department stores. Each day Jerry tries to figure out how long it will take him to deliver the equipment.

Today he knows he will be driving on the interstate highway and knows his average speed will be about 60 MPH. He knows that he is traveling to a town that is 300 miles away. He has figured it will take him about 5 hours.

However, today he has only traveled 200 miles in 4 hours. There has been a lot of construction on the road and the speed limit has been slower than usual. Now, Jerry needs to figure out how many miles he will travel in 5 hours in order to fill out a report for his supervisor. He also needs to call the company operator, so the company can notify the department store of his new expected delivery time.

- Is it common for delays to happen on the highway? Does this happen when trying to project how long it will take to drive from one place to another.
- 2. How far will Jerry drive in 5 hours? How long will it take him to get to his destination?
- 3. How could Jerry calculate his travel time better?



<sup>66</sup>Credit card choice for a small business is critical especially if cash flow is uneven. Charges for late fees, days to pay without charge and so forth all make a difference when picking a card for a small business. Bank staff can help with these kinds of choices."

> Claudia Murch, Southern Michigan Bank and Trust, Battle Creek, MI (2008)

#### Vocabulary

Credit card • Advertisement • Interest rate

### Scenario 23: Using a Credit Card — Sari

Sari had started her own alteration business. She had over 500 clients and was working out of her house. She saw an advertisement that said "Apply today for a Rainbow Bank credit card with a low interest rate of 2%." Sari thought it sounded like a great deal. She had just opened a savings account and the interest was 3%, so she thought that the interest rate for the year would be 2% for the credit card. She knew she needed a credit card for her business and filled out the paperwork. She did not read the additional information about the credit card.

Sari charged \$1,000 on her credit card for different items she needed in her business. The first month she made the minimum payment of \$100. When she received the next month's statement she owed \$918. She was charged \$18 interest. Sari then figured that the 2% would be charged every month on her remaining balance. She now realized that made the Annual Percentage Rate (APR) really 24%. This was a high interest rate. Sari was really upset.

Use the chart to see how much interest Sari will have to pay if she only makes a payment of \$100.00 a month.

This is how it is figured:

- FirstChange the percentage rate of 2% to a decimal.<br/>(move the decimal 2 places to the left)<br/>2% = .02
- **Second** Multiply the balance \$900 times .02 (\$1,000 - \$100 = \$900) \$900 x .02 = \$18
- ThirdBalance + Interest = New Balance\$900 + \$18 = \$918



EFF Work Readiness Profile Task Use Systems: Monitor and correct performance; monitor quality of own work.



## Fill in the chart.

Date	Balance	Interest Charged	New Balance (Bal + Int)	Payment	Remaining Balance
Jan 1	\$1000			\$100	\$900

What is the total interest paid? \_\_\_\_\_

How much did the items cost by using the credit card?

- 1. Why do you think Sari is upset?
- 2. What should Sari have done differently?
- 3. How does advertising make a credit card look like it is a good card to apply for?



<sup>CC</sup> The key for us is measurement. Literally just being able to use a ruler is critical. An employee's ability to measure the thickness of each sheet of plastic is a key skill in every one of our facilities in the area. We have new employees come in and say I know how to do this but the reality is they have no clue."

> Wendi Rudolph, West Michigan Human Resource Director, MI (2008)

#### Vocabulary

Machines • Chemicals • Directions • Streaking • Discolored Mixture

# Scenario 24: *How Do You Measure the Chemicals?* — *Lonny*

Lonny has a new job working for a nursing home. He is the assistant custodian. He is in charge of taking care of the tile floor and carpet throughout the complex. He has to use several different machines to clean the floors. Each machine has a different set of instructions and directions for mixing the chemicals to be used in each machine.

The machines are color-coded in order to make sure the correct directions are followed. The blue machine uses 3 parts disinfectant chemical to 4 parts water. The red carpet machine uses 4 parts water to 1 part disinfectant chemical, 3 parts soap and 2 parts drying chemical. The third machine is the green machine. It uses 4 parts water, 1 part soap and 2 parts of a disinfectant chemical.

Lonny has gone through the training. He is responsible for cleaning the lobby's carpet tonight. Lonny will use the red carpet machine. All of the directions are given for 50 sq. feet of cleaning surface. Lonny knows that the surface he is cleaning will be 75 sq. feet. He gets the instructions for the red machine. He knows he has to mix 1 batch for 50 sq. feet and then another 1/2 batch for the additional 25 sq. feet for a total of 11/2 times the mixture the directions call for. Lonny has had a bad day. He is tired and wants to finish this job fast. He is not sure about increasing the amount of mixture, but he still decides he will make all the mixture at the same time. He quickly reads the directions and then puts the directions down and mixes the mixture. He mixes 6 parts water, 41/2 parts disinfectant, 2 parts soap and 3 parts drying chemical. He then cleans the carpet. Lonny notices the



EFF Work Readiness Profile Task Solve Problems: Identify actual or potential problems related to one's own work.

Know How to Learn: Accept help from supervisors and coworkers.



carpet is streaking and seems to be discolored as it dries. Lonny is concerned and asks Cesar, his supervisor, to check it. Cesar looks at the carpet and knows Lonny has used the wrong strength of chemicals.

- 1. What can happen when we try to rush through a job?
- 2. Why do you think the directions and machines are colored coded?
- 3. What mistake did Lonny make?
- How is the measurement issue described in the Wendi Rudolph quote (page 45) different from Lonny's problem? List different measurement issues that come up in work situations.



**W** represent several industrial clients in the area and each client requires a different set of math skills. One client requires a complete knowledge of decimals, another multiplication, one demands metrics, and reading a ruler whether standard or metric is important to some. Sometimes we really have to search for someone with the required skill set."

Michelle Hoke, Employment Group, Battle Creek, MI (2008)

### Vocabulary

Reliable • Energetic • Determined • Figure out • Solution Bar graph • Record

## Scenario 25: Bar Graph — Celine

Celine is in charge of the food service at Billy Bob's Burgs 'n Stuff fast food restaurant. She is responsible for fast and reliable lunch service to customers. There have been problems with customers waiting too long at the order window. Other times the restaurant has run out of the food they want to order. These customers are then walking away! The employees who work with Celine are energetic and care about their jobs. Something is wrong and Celine is determined to figure out what is wrong and to find a solution.

Celine decided to record the number of customers who came to Billy Bob's between 11:30 a.m. and 1 p.m., the busiest times for lunch. She also recorded what the most common menu items were at lunch.

Looking at the chart, Celine knows now when she has the most customers. She has recorded the number of customers for three weeks and each week is the same.





## 1. A Vertical Bar Graph (Column Graph):



### **EFF Work Readiness Profile Task**

Allocate Resources: Use basic math well enough to get the job done.

Solve Problems: Cope with a work situation or tasks that change frequently.



Now Celine looks at the graph she made for the food sales. She wanted to know what item on the menu sold the most. It is easy to see what most customers order at lunch.

She speaks with her manager and shows her the graphs. The manager and Celine must now decide on the next step so the business does not lose customers.



## 2. A Horizontal Bar Graph:

- Why would it take such a long time for the customers to order? Why would a restaurant run out of a food item? Does this often happen at restaurants?
- 2. Should people leave if the service is too slow, or if the restaurant runs out of some food items?
- 3. What else should Celine record and put in graph form to help identify what the sales loss may be?
- 4. What are some possible solutions?



"We make boxes at my facility. Sometimes the machine operator has to make a box with unusual folding angles and measure that to the sixteenth of an inch. They use a tape measure and markings on the machine to mount the material. Once we start running the material can slip and it must be readjusted. Knowing how to readjust forward or backward can be tricky. It would be nice if new hires had gone through the process before they get to the worksite."

Ann Pearsall, Quantum Sail Design Group, Traverse City, MI (2008)

#### Vocabulary

Carpenter • Plywood • Measurement • Project • Piece • Convert Units of measure

#### Scenario 26: Cutting to Measurements — Patrick

Patrick works for a carpenter helping to build countertops for kitchens. He has to measure the wood he has in stock and find out if there will be enough wood for the projects assigned. He also has to decide where to cut the wood pieces in order to save as much wood for other projects.

The measurements are given to him in inches and feet. Inches and feet are called units of measure. He has to convert some of these measurements to know for sure if it will be accurate. For today's project he needs a piece of plywood  $24'' \ge 36''$ . He has a full sheet of plywood in stock. He knows it measures  $4' \ge 8'$ . Now he must decide if he has enough wood and how he should cut the piece he needs from the large sheet of plywood. Most of his projects need the 24'' width, but the length varies.

He decides that he will arrange the cut in the corner. He will measure down 24'' on the 4' side of the plywood. But he is still not sure this will be the best cut.

#### **Think About It**

- 1. What are some tools a carpenter uses on the job?
- 2. Are some of these tools often useful at home?
- 3. What safety precautions need to be taken?
- 4. Do you think that Patrick's way will be the best way to cut the wood?
- 5. What would you do first before you cut the wood?



EFF Work Readiness Profile Task Allocate Resources: Make sure materials,

tools, and equipment are available to do the job effectively.





Allocate Resources: Use basic math well enough to get the job done.

Solve Problems: Adjust to unexpected problems and situations by seeking advice from a supervisor or appropriate others. C The ability to use and apply the basics of measurement and mathematics is essential in the upholstery industry."

Brian Neu, Neuco Seating, Inc. Traverse City, MI (2008)

#### Vocabulary

Expensive • Measurement • Upholstery • Vinyl

## Scenario 27: Measurement & Mathematics — Fred

Fred runs a local upholstery shop. Dale's Diner needs thirty of their chairs upholstered. Dale has hired Fred for the job. Fred measures each of the chairs to make sure that they are all the same size. Based on his measurements, Fred will need to cut the vinyl into a 24" by 24" square in order to cover each chair.

The vinyl material that Fred uses comes in rolls that are 54" wide and is sold by the yard. Fred does not want to waste any material since it is expensive. He draws the following picture to help him figure how many yards of vinyl he will need.

Complete the drawing for Fred by drawing in the correct number of 24" by 24" squares. Help Fred determine how much vinyl he will need to purchase for this job and the length and width of the scrap vinyl that he will have left.

Scale: 1/2'' = 24''



- 1. Why does Fred measure each of the chairs separately, rather than just one chair?
- 2. Why is it important for Fred to have an accurate measurement of how much vinyl material is needed for the job?
- 3. How much vinyl material must Fred purchase?
- 4. What is the length and width of the left-over scrap material?



``Every time I interview someone, they say, `Ah, I haven't used a ruler forever! I don't know how to do that.' There is always trouble. I had a client who had to get 8 out of 10 correct on the metric ruler in order for us to be able to place him in a job."

Michele Hoke, Employment Group, Battle Creek, MI (2008)

#### Vocabulary

Area • Manual labor • Landscaping • Gated community Flower beds

## Scenario 28: How Many Plants? — Shard

Shard works for a large landscaping company. Usually he supervises a crew that does most of the manual labor. He has told his boss he would like to learn more about other jobs in the company. They have a new job landscaping a gated community that wants to put in flower beds on each side of the two separate entry gates. Shard asks if he could figure how many flower plants will be needed for the area.

Shard knows all four beds will be squares. Each side of the square bed measures 5 feet. Shard first finds the area of one of the squares. He knows that to find the area you must multiply the length times the width. Then he will multiply that number times the number of flower beds. Now he must figure out how many plants he will need to order for the flower beds.

These are the steps he needs to go through to find out how many plants are needed.

Step 1: Find the area of one flower bed. L x W = Area 5' x 5' = 25 sq. feet



Step 2: Find the total area of all the flower beds.
4 (flower beds) x 25 sq. ft. of one flower bed = total area
4 x 25 sq. ft. = 100 sq. ft.

The other job he has to figure is how many plants will be needed for each bed. The plants will be spaced 6 inches apart between rows (X) and 6 inches apart between plants within the row (Y). He knows he will be leaving enough room for them to fill in as they grow.



#### **EFF Work Readiness Profile Task**

Allocate Resources: Use basic math well enough to get the job done.

Solve Problems: Identify actual or potential problems related to one's own work; report them in a timely manner according to company policy; help to fix them.

**Responsibility:** 

Show initiative in carrying out work assignments.



- Step 3: Find the total space needed for each plant. Multiply the distance between the plants within the rows (X) by the distance between the row (Y).  $X \times Y =$ total space needed  $6 \times 6 = 36$  sq. in
- Step 4: In order to find out how many plants are needed he has to figure out the total number of square feet of planting area and multiply it by 144 to convert square feet to square inches.

The total square footage of all the planting areas equals 100 sq. ft.

Total sq. ft. x 144 (to convert sq. ft. to sq. in.) = total sq. inches

100 x 144 = 14,400 sq. in.

*Step 5*: Divide the total square inches by the total space needed by each plant. This will be the number of plants needed.

14,400 sq. inches ÷ 36 sq. inches = how many plants

- 1. Do you think a landscaper has an easy job?
- 2. What are some problems a landscaper may have when trying to decide what plants will grow in the place set aside for them?
- 3. Where does a landscaper go to buy the large number of plants needed?
- 4. How many plants will be needed for the project? How many for each flower bed?



**G** am talking as a manufacturer about lean principles. However, they are applied in offices, hospitals and government. You see lean principles applied in many, many different areas. The basic goal of 'lean principles' is to do more with less."

Win Irwin, Irwin Seating Company, Grand Rapids, MI (2008)

#### Vocabulary

Lean • Bottom line • Crucial • Salvage • Scrapped

### Scenario 29: A "Lean" Enterprise — Rick and Bea

Rick and Bea work at a local auto parts plant in Detroit. Making perfect parts is a difficult job. Each part costs the company money to make. When a part is not made correctly, it must be scrapped. Each part that is scrapped or thrown away costs the company money. However, Rick and Bea know that sometimes these parts can be saved. The company calls this "salvaging a part." Being able to salvage a part and use it again is important. It saves the company money. Rick and Bea got a raise last year because their team saved the company money by salvaging good parts instead of just throwing them away.

The company recently hired a new employee, Dell. Dell learned the job very quickly. He is able to make lots of parts in an hour. However, Dell often makes errors. Instead of salvaging the parts, he just scraps them. Dell says it takes too long to salvage parts. It's easier to just throw them away and make new ones. Rick and Bea are concerned. They have been with the company for five years. They do not think that Dell should be so wasteful. However, they like the new worker and don't want to get him in trouble. What should they do?

## **Think About It!**

- 1. What would you do if you were Rick and Bea?
- 2. Why is it important to help a company make money?
- 3. How would you define the "bottom line"?



#### **EFF Work Readiness Profile Task**

Allocate Resources: Use basic math well enough to get the job done.

Solve Problems: Identify actual or potential problems related to one's own work.





Allocate Resources: Use basic math well enough to get the job done.

Solve Problems: Identify actual or potential problems related to one's own work. **C** The ability to do basic math is crucial in the sign business. Basic math is required to order the correct amount of material, cut the material accurately and to make the most efficient use of that material."

Daniel Siwik, Fast Signs, Traverse City, MI (2008)

#### Vocabulary

Department • Multiplication • Processed • Problem solving

### Scenario 30: Using Math to Get the Job Done — Nate

Nate works in the shipping department of Grand Rapids Plastics. It is important that Nate's team gets orders processed quickly. The company has a policy that products are shipped within 24 hours of being ordered. Nate likes the fast pace of his job. He knows how many items are in each box so all he has to do is use his mathematical skills to get an order quickly processed. Today, Nate's team has to fill more orders than usual. Nate works hard to get his part of the job done. After he has finished filling thirty orders, he notices that one of the workers, Zee, is still counting items for her first order.

Nate is tired. He knows that all of the orders must be filled before the end of the day. However, he does not want to do his work and Zee's work, too. Nate watches Zee counting each item. What a slow way to work, Nate thinks to himself. Why doesn't Zee just multiply the number of items by the number of boxes?

Nate decides to talk with Zee. He tells her that it is not fair that she does not fill as many orders as the rest of the team. Zee looks embarrassed. She shares with Nate that she has never learned to do basic math. Zee says she does not know how to multiply numbers. Nate is surprised! How can he help Zee work faster if she doesn't know how to multiply numbers? Nate thinks about the problem-solving process that his boss uses. He talks with Zee about some ideas. Nate wants to make sure that the team has the skills needed to get the job done well.

- 1. How does Zee's lack of mathematical skills impact her team?
- 2. What mathematical skills does Zee need to process orders more quickly?
- 3. How can Zee become better at processing orders more quickly?



<sup>66</sup> Thave one customer who calls every week to ask how much she will have deposited into her checking account. This afternoon, she will call and ask how much her paycheck would be for the week. Probably half of it will be gone to cover over drafting charges she owes. I looked at her account history and last year she paid \$6000 in overdraft fees!"

Claudia Murch, Southern Michigan Bank and Trust, Battle Creek, MI (2008)

## Vocabulary

Advertisement • Appointment • Borrow • Difficult • Interest Payday • Lender

## Scenario 31: Payday Lenders: It's Harder Than It Looks — Lukas

Lukas is employed at the Flint Furniture Company. He makes a good salary and is able to support his family. Because Lukas makes a good salary, he enjoys spending money on his family. Sometimes he borrows money from the bank to help him cover the monthly bills. However, the last few months have been difficult. Lukas has not had the opportunity to make any overtime. Lukas always counts on his overtime salary to pay his loans. Lukas and his wife find that they cannot pay all of their monthly bills. They are having a tough time making ends meet.

Two months ago, Lukas and his wife did not have enough money to pay their rent. The bank would not loan Lukas any more money. However, Lukas saw the following advertisement in the newspaper.



#### **EFF Work Readiness Profile Task**

Allocate Resources: Use basic math well enough to get the job done.

Solve Problems: Cope with a work situation or tasks that change frequently; adjust to unexpected problems and situations by seeking advice from a supervisor or appropriate others.





Lukas went in for an appointment. He asked the company for \$500 so he could pay his rent. All Lukas had to do was sign some forms and write the company a postdated check for \$575. The forms said that the company would take the rest of their money out of Lukas's paycheck each week. They said they would "garnish" his paycheck. That means they would take out \$50 from each paycheck until Lukas had paid off the loan.

Lukas was excited that he could pay his rent. However, when he got home, Lukas and his wife read the contract. If Lukas did not pay off the loan in time, he was going to owe Money When You Need It, Inc. more than \$1,000. The interest on the loan was as much as he had borrowed! What were they going to do?

- Lukas borrowed from a company known as a "payday lender." Did Lukas think it was as easy to get a loan as the ad said it was?
- 2. What advice would you give Lukas about what he could have done as an alternative to borrowing from a payday lender?
- 3. Do payday loans provide a necessary service to people? Why or why not?



<sup>CC</sup> LACKS has what are called production entry sheets. Employees have to record down time and up time for their labor and for their machine. If they don't write in down time properly and the machine was not running then that affects the number of parts produced during the shift. Production is not going to match expected output because there are so many parts per hour figured into what the machine should produce. Basic skills are important for many reasons."

Ruthann Ferris, LACKS Industries, Grand Rapids, MI (2008)

#### Vocabulary

Downtime • Mechanical • Production • Production Rate • Shift

#### Scenario 32: How Much Did I Produce? — Gordon

Gordon works at the Grand Rapids Machinery Company. His job is to make parts for small engines. Gordon makes the parts using a very large machine. The machine can make 120 pieces per hour. Gordon works an eight-hour shift each day. His supervisor expects that Gordon will be at maximum production each day. Because machinery sometimes breaks down, Gordon's production rate is set at 108 pieces per hour. This rate allows 10% downtime. Downtime includes machine problems and operator error.

Gordon's supervisor is concerned that Gordon has poor work habits. His production is lower than the set rate. The supervisor meets with Gordon. He shows Gordon his production rate for the past week. The supervisor tells Gordon that his rate is computed by dividing the number of parts produced by the amount of time the machine ran during the day.

Gordon looks at the chart and figures out his production time. He wants to make sure that his supervisor is correct.

Complete the following chart by figuring out how many parts Gordon produced each hour. Divide the number of parts that Gordon produced per day by the number of hours the machine was running to get Gordon's rate-per-hour. The first one is done for you.



#### **EFF Work Readiness Profile Task**

Allocate Resources: Use basic math well enough to get the job done.

Solve Problems: Identify actual or potential problems related to one's own work.



Day	Machine Running	Number of Parts	Production Rate
	Time	Produced per Day	per Hour
Monday	8 hours	688	86 pieces per hour
Tuesday	8 hours	720	
Wednesday	8 hours	768	
Thursday	8 hours	672	
Friday	8 hours	560	

- 1. Did Gordon produce his minimum number of parts each day?
- 2. How many parts was Gordon behind the expected production rate for the week?
- 3. What reasons might Gordon provide his supervisor as to why he did not meet his daily quota?
- 4. Why is it important for business to have set production rates?



accurate: *ak-ye-rat*, adj. — free from mistakes.

**advertisement**: *ad-var-'tīz-mant*, n. — a public notice; especially : one published in the press or broadcast over the air.

**application**: *a-pla-'kā-shan*, n. — a form used in making a request.

**appointment**: *a-point'mant*, n. — a scheduled meeting with one person or a group of people.

**area**:  $er-\bar{e}-\partial$ , n. — the surface inside a figure or shape; especially : the number of unit squares equal to the amount of space the surface covers.

auto mechanic: 'ä- tō mi-'ka-nik, n. — one who repairs cars.

**axis**: 'ak-səs, pl: axes: 'ak -'sēz. n. — one of the reference lines of a coordinate system.

**band concert**: *'band 'kän-sərt*, n. — a public performance of a group of musicians organized for ensemble.

**bar graph**: *'bär 'graf*, n. — a graphic means of comparing numbers using rectangles with lengths proportional to the measure of the data or things being compared.

**benefits**: *'be-na-fits*, n. — a service (as health insurance) or right (as to take vacation time) provided by an employer in addition to wages or salary.

**bid**: *'bid*, n. — an offer of a price.

**borrow**: *bär-ō*, v. — to receive with the implied or expressed intention of returning the same plus interest.

**bottom line**: *bät-am līn*, n. — financial considerations (as cost or profit or loss).

**budget**: *bəj-ət*, n. — a plan for using money.

**calculation**: *kal-kay-lā-shan*, n. – the process of finding an answer by performing mathematical operations (as addition, subtraction, multiplication, and division).

**calendar month**: *'ka-lan-dar 'man(t)th*, n. — a measure of time corresponding nearly to the period of the moon's revolution and amounting to approximately 4 weeks or 30 days or  $\frac{1}{12}$  of a year. Examples: June, July, October...

**capability**: *kā-pə-'bi-lə-tē*, n. — qualities/attributes (such as physical or mental power) required for performance or accomplishment.

**carbohydrates**: *kär-bō-hī-drāts*, n. — any of various compounds of carbon, hydrogen, and oxygen (as sugars, starches, or celluloses) most of which are formed by plants and are a major animal food.

carpenter: 'kär-pan-tar, n. — a worker who builds or repairs wooden structures or their structural parts.

**cash register**: *'kash 're-ja-star*, n. — a business machine that usually has a money drawer, indicates the amount of each sale, and records the amount of money received.

centimeters: sent-a-met-ars, n. — metric measures equaling one-hundredth of a meter.



# Glossary

**change**: *chānj*, n. — money returned when a payment exceeds the amount due.

**chaperon**: *'sha-pə-rōn*, n. — one delegated to ensure proper behavior.

**chemicals**: *'ke-mi-kals*, n. — substances created by a chemical process that, in this context, interact with water and soap resulting in a cleaning solution.

**commission**: k-mish-an, n. — a fee paid to an agent or employee for taking care of a piece of business (a 5% sales commission).

**competition**: käm-pa-'ti-shan, n. — the effort of persons or firms to attract business by offering the most favorable terms.

**compliments**: käm-pla-mants, n. — expressions of respect, affection, or admiration; especially : admiring remarks.

**compound**: *käm-'paund*, n. — a fenced or walled-in area containing a group of buildings and/or equipment.

**computerized**: *kəm-'pyü-tə-rīzd*, transitive v. — carried out, controlled, or produced by means of a computer.

**cons**: *käns*, n.— arguments or evidence in opposition of an idea.

**convenience store**: *kan-vēn'yans stör*, n. — a small market that is open many hours.

**convert**: *kan-'vart*, v. — to change from one form or function to another.

**cost**: *kost*, n. — the amount paid or charged for something.

credit card: 'kre-dit 'kärd, n. — a card authorizing purchases on credit: the provision of money, goods, or services with the expectation of future payment.

**crucial**: *'krü-shəl*, adj. — important or essential as resolving a crisis.

**customer**: kus'ta-mar, n. — one who buys a product or a service.

**data processing**: '*dā-tə*' prä-'ses-ing, n. — the converting of raw data to machine-readable form and its subsequent processing (as storing, updating, combining, rearranging, or printing out) by a computer.

**delivery**: di-'li-v(a-)re, n. — the act or manner of taking and handing over something to another or leaving it for another.

**department**: *dĭ-părt'mant*, n. — a subdivision of a larger organization or system, such as a government or business.

**department store**: *di-'pärt-mant 'stor*, n. — a business establishment that sells diversified merchandise that is kept in specific areas/departments.

**designated**: *dez-ig-nāt-ed*, v. — appointed or chosen by name for a special purpose.

**determined**: *di-'tər-mənd*, adj. — having reached a decision : firmly resolved.

**dietary**: *dī-ə-ter-ē*, adj. — of or relating to a diet or to the rules of diet.



**difficult**: *dĭf'ī-kŭlt*, adj. — hard to do.

**directions**: *dĭ-rěk'shəns*, n. — instructions for doing something.

**disappointed**: *dis-a-pŏint-ed*, adj. — defeated in expectation or hope ("we were disappointed that they couldn't go.").

**discolored**: *dis-'ka-lard*, v. — changed color especially for the worse.

**downtime**: '*dau'n-'tīm*, n. — time during which production is stopped especially during setup for an operation or when making repairs.

electrical: *i-'lek-tri-kəl*, adj. — relating to, or operated by electricity.

**emergency**: *i-mər-jən-sē*, n. — an unexpected situation that calls for immediate action.

**energetic**: *e-nar-'je-tik*, adj. — operating with or marked by vigor or energy.

establish: *is-tab-lish*, v. — to set on a firm basis.

estimate: es-ta-mat, n. — a statement by a contractor of the probable cost for a job.

estimation: es-ta-mā-shan, n. — a rough or approximate calculation.

**expensive**: *ik-'spen(t)-siv*, adj. — characterized by high prices.

**FICA**: *fy-ka*, n. — an acronym that stands for the Federal Insurance Contributions Act; a payroll or employment tax in the United States.

**figure out**: *'fi-gyər 'au't*, transitive v. — to find a way to solve a problem.

**fixed expense**: *fikst ik-spen(t)s*, n. — a cause of spending that is not changing.

**flexible expense**: *flek-sa-bal ik-spen(t)s*, n. — a cause of spending that is readily changed or changing.

**flower beds**: *fla(-a)r beds*, n. — a plot of ground prepared for plants and flowers.

formula: 'for-mya-la, n. — a general fact, rule, or principle expressed in usually mathematical symbols.

**frustrated**: *'fras-'trāt-ed*, transitive v. — feeling discouraged, anxious.

**gated community**: 'gāt-ed ka-myü-nat-ē, n. — a group of houses, condominiums, or apartments requiring passage through an entrance that is either guarded or requires a code to open the gate.

**gross pay**: 'grōs 'pā, n. — a salary or wage consisting of an overall total before any deductions are taken out.

**hourly rate**: '*au* (-*ə*)*r*-*lē* -*rāt*, n. — the charge or cost per hour.

**incorrectly**: *in-kə-rek-(t)lē*, adv. — not accurately or exactly.

install: *in-'sto'l*, n. — to set up for use or service.

**installment payment**: *in-stŏl-mənt pā-mənt*, n. — money given to pay a debt in installments (parts into which a debt is divided when payments are made over a period of time).



# Glossary

**interest**: *'in-t(a-)rast*, n. — an excess above what is due or expected.

**interest rate**: *'in-t(ə-)rəst 'rāt,* n. — a charge for borrowed money; generally a percentage of the amount borrowed.

**Internal Revenue Service** (**IRS**): *in-'tər-nəl 're-və-'nü 'sər-vəs,* n. — a department of the United States government responsible for collecting taxes.

interstate: *in-tar-'stāt*, n. — any of a system of expressways connecting most major United States cities.

**interview**: *'in-tər-'vyü*, n. — a formal consultation/ meeting to evaluate qualifications (as of a prospective student or employee).

inventory: *ĭn'van-tōr'ē*, n. — a detailed list of all products and materials in stock.

**invoice**: *'in-vois*, transitive v. — to bill or charge a fee for an item or service.

**knowledgeable**: *näl-ij-a-bal*, adj. — having the awareness of something or of having information.

**landscaping**: *land-skāp-ēŋ*, v. — improving the natural beauties of a piece of land by grading, clearing, or gardening.

lean: 'len, adj. — lacking waste, characterized by economy of operation.

loan: *lon*, n. — money lent at interest.

**machines**: *mə-'shēns*, n. — mechanically, electrically, or electronically operated devices used for performing tasks.

**manager**: *mănîj-ər*, n. — a person who manages (looks after and makes decisions about) a business.

**manual labor**: *man-yə(-wə)l lā-bər*, n. — work requiring or using physical skill and energy performed by workers for wages.

**manufacturing**: *măn'yə-făk'chər-ĭng*, v. — making or processing things from raw materials using machinery.

mark-up: 'mär-kap, n. — an amount added to the cost price to determine the selling price.

**measurement**: *'me-zhar-mant*, n. — a figure, extent, or amount obtained by measuring.

**measurements**: *'me-zhar-mants*, n. — findings of the size, extent, or amount of things.

**mechanical**: *mi-'ka-ni-kəl*, adj. — made or operated by a machine or machinery.

**merchandise**: *mər-chən-dīz*, n. — the goods that are bought and sold in trade.

**mileage**: *mī-lij*, n. — an allowance for traveling expenses at a certain rate per mile.

**mixture**: *'miks-chər*, n. — a product of mixing two or more components in varying proportions.

**multiplication**: *məl-tə-plə-'kā-shən*,n. — a mathematical operation that takes two numbers and gives an answer equal to the sum of a column containing one of the numbers repeated the number of times of the other number (the multiplication of 8 and 3 is the same as the sum of 8+8+8).



**neighboring**: *'nay-b(a-)ring*, adj. — located next to or near to a place or location.

**net pay**: *net pā*, n. — salary or wages after all charges or deductions are taken out.

**notify**: *'nō-tə-'fī*, transitive v. — to inform or report the occurrence of.

**nutritional label**:  $n(y)\ddot{u}$ -trish-nəl lā-bəl, n. — a chart that is attached to or printed on a food item to identify or describe the nutritional values of that food.

**nutritionist**:  $n(y)\ddot{u}$ -trish-( $\partial$ -)nist, n. — a specialist in the study of nutrition.

options: 'ap-shans, n. — something that may be chosen; an alternative course of action.

overhead: *ō*-vr-hed, n. — general business expenses (as rent, heat, or insurance).

overtime hours: 'ō-vər-tīm 'au(-ə)rs, n. — hours worked in excess of a standard day or week.

package cost: pak-ij kost, n. — the price for single package or serving of an item or commodity.

**partial**: '*pär-shəl*, adj. — of or relating to a part rather than the whole.

**payday lender**: '*pā*-'*dā* '*lendr*, n. — a person or company that loans money to people based on the amount of the borrower's regular paycheck. These people/companies are known to charge very high interest rates.

percent: par-'sent, n. — an amount figured on the basis of a whole divided into 100 parts.

percentages: par-sent-ijs, n. — parts of a whole expressed in hundredths. For example: 10%, 50%, 75%.

**piece**: '*pē*s, n. — a part of a whole.

**plywood**: '*plī-'wu'd*, n. — a structural material consisting of sheets of wood glued or cemented together with the grains of adjacent layers arranged at right angles or at a wide angle.

portions: *por-shans*, n. — servings of food, enough of one kind to serve one person at one meal.

**problem solving**: *pr\u00e4b-l\u00e4m s\u00e4lv-ing*, v. — to find a solution for something that causes one trouble or irritation.

processed: pra-'sesd, v. — taken care of according to a routine.

production: pra-'dak-shan, n. — the act or process of producing, or making something.

**production chart**: *prə-'də-shən 'chärt*, n. — a sheet giving information about the total output of a job or project.

production rate: pra-'dak-shan rāt, n. — the speed at which something is being produced.

**profit**: *präf-at*, n. — the gain after all the expenses are subtracted from the amount received.

**project**: *'prä-'jekt*, n. — a planned undertaking.

**pros**: *'proz*, n. — an argument or evidence supporting an idea.



# Glossary

purchases: par-chases, n. — things purchased, bought with money.

quantity: 'kwän-tə-tē, n. — total amount or number.

**receipt**: *ri-'sēt*, n. — a document containing the details of a purchase/sale.

**record**: *ri-'ko'rd*, transitive v. — to set down in writing : furnish written evidence of.

**registered nurse**: *rej-a-stard nars*, n. — a graduate trained nurse who has been licensed to practice by a state authority -- called also RN.

**regular hours**: 're-gya-lar 'au(-a)rs, n. — a fixed schedule of time worked.

**reimbursed**: r*ē*-*a*m-b*a*rsd, v. — having made restoration or payment of an equivalent to (reimbursed him for his traveling expenses).

**reliable**: *ri-'lī-a-bal*, adj. — suitable or fit to be relied on : dependable.

remnants: 'rem-nants, n. — unsold or unused ends of piece goods such as fabric or carpet.

**representative**: *rep-ri-zent-at-iv*, n. — one that represents, acts for or stands in for another or others especially through delegated authority.

**request**: *ri-'kwest*, n. — something asked for.

**resident**: *rez-ad-ant*, n. — one who resides (lives) in a place.

**restaurant**: *rěs'tər-ränt*, n. — a business place where meals or refreshments may be bought.

salvage: 'sal-vij, transitive v. — to rescue or save especially from wreckage or ruin.

scrapped: skrapt, transitive v. — to get rid of fragments of stock removed in manufacturing.

**shift**: *shift*, n. — the period of time during which employees work.

**shipment**: *ship-mant*, n. — the goods shipped or delivered.

**sodium**: *sod-e-am*, n. — the name of a chemical commonly used to refer to table salt.

**specifications**: *spes-(a-)fa-kā-shans*, n. — descriptions of work to be done or materials to be used (the architect's specifications for a new building).

**streaking**: '*strē-kiŋ*, n. — lightening (as by chemicals).

**square foot**: *skwa(ə)r füt*, n. — a measurement that is 12 inches on each side. To find the square foot measurement of an area, multiply the length(in feet) by the width(in feet) and by the height (in feet).

**State MI**: *stāt MI*, n. — the State of Michigan.

**subtotal**: *səb-tōt-əl*, n. — the sum of part of a series of figures or numbers.

**supervisor**: *soo'pər-vī'zər*, n. — a person who directs and inspects the work of others.

**solution**: *sə-'lü-shən*, n. — an answer to a problem.



**standards**: *stan-dərds*, n. — something set up by authority or by general consent as a rule for measuring or as a model.

**stocking**: *'stä-kiŋ*, v. — receiving and keeping track of stock (items for sale).

table: 'tā-bəl, n. — a systematic arrangement of data usually in rows and columns for ready reference.

**taxes**: '*taks-ses*, n. — charges, usually of money, imposed by authority on persons or property for public purposes.

**temporary**: 'tem-pə-'rer-ē, adj. — lasting for a limited time; not permanent.

till: 'til, n. — a money drawer in a store or bank.

**time card**: *tīm kärd*, n. — a card used with a time clock to record an employee's starting and quitting times each day.

**toiletries**: *tŏi-la-trēz*, n. — things (such as a soap, lotion, toothpaste, or cologne) used in grooming oneself.

**tool and die**:  $t\ddot{u}l \partial n(d) d\bar{i}$ , n. — using implements (such as a hammers, saws, knives, or wrenches) or working by hand or by machine to make various devices used for cutting, shaping, or stamping a material or object.

**total**: *tot-al*, n. — an entire amount.

**tubing**: *t*(*y*)*ü*-*biŋ*, n. — material in the form of a tube (a long hollow cylinder).

**units of measure**: 'yü-nəts əv 'me-zhər, n. — determinate quantities (as of length, time, heat, or value) adopted as a standard of measurement.

**upholstery**:  $\partial p - h \bar{o} l - st(\partial -) r \bar{e}$ , n. — materials (as fabric, padding, and springs) used to make a soft covering especially for a seat.

**vinyl**: 'vī-nəl, n. — a material made through the combination of a vinyl compound or a product (as a textile fiber) made from such a chemical compound. It is sometimes referred to as plastic.

**workstation**: *'wərk- stā-shən*, n. — an area with equipment for the performance of a specialized task.

yard: 'yärd, n. — a unit of length equal in the United States to 3 feet or 0.9144 meter.

**yardage**: *'yär-dij*, n. — an aggregate number of yards.

**zones**: 'zōns, n. — sections of an area or territory created for a particular purpose.
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