

23. Mike works at Cheesecake King. He earns \$11 per hour as a busboy. The waiters he helps give him 25% of their tips.

- If Mike worked 6 hours today, how much did he earn, without tips?
- The waiters Mike assisted waited on 16 tables, and the total bill from all these tables was \$1,188. The waiters earned 15% in tips, and gave 25% of these earning to Mike. How much did Mike make in tips?
- What was Mike's total salary for the day?
- What were Mike's average earnings per hour, including tips? Round to the nearest cent.

24. Max works  $x$  hours per week and has a 3-week vacation each year. Mindy works  $y$  hours per week and has a four-week vacation each year. Express their combined number of work hours per year.

25. Gary earns 42,990 per year. He is paid weekly. He currently has a \$456-per-month car loan payment, and he pays \$1,277 per year for auto insurance. Is one week's paycheck enough to pay for his monthly auto loan and his monthly cost of insurance? Explain.

26. The following spreadsheet can be used to compute total weekly pay, given the hours, hourly rate, and overtime rate.

	A	B	C	D	E	F	G	H
1	Hours Worked	Regular Hours	Hourly Rate	Regular Gross Pay	Overtime Hours	Time-and-a-Half Overtime Rate	Total Overtime Pay	Total Gross Pay
2	42	40	10.50					
3	44	40	9.00					
4	45	40	14.00					

- Write the formula to compute the regular gross pay in cell D2.
- Write the formula to compute the overtime hours in cell E2.
- Write the formula to compute the time-and-a-half overtime hourly rate in cell F2.
- Write the formula to find the total overtime pay in cell G2.
- Write the formula to compute the total weekly pay in cell H2.
- Use your spreadsheet to fill in the missing entries.

27. Marty is working with a math problem that defies intuition. He is going to pay his gardener for the entire month of July. He will pay the gardener every day. On the first day, he will pay the gardener \$0.01. On the second day, he will pay double the first day, \$0.02. On the third day, he will double the second day's pay and pay \$0.04.

- Make a grid that looks like a calendar with 7 columns and 5 rows.
- Fill in the dates from July 1–July 31.
- Enter the amount Marty pays his gardener on each day.
- On what day will the gardener's pay exceed \$1,000,000 for the first time?
- If  $x$  represents the day and  $y$  represents the salary for that day, draw a scatterplot for the first two weeks of July.

28. Melissa has bought a \$2 lottery ticket every week for the past 20 years. This week she won for the first time—\$2,000 in her state lottery. Compare these winnings to her total investment, and explain if the lottery was a worthwhile endeavor for her.

12. Hector works in a gas station and earns \$8.60 per hour. Last week he worked 29 hours. What was his gross pay?

13. Eddie works at Beep-N-Kleen car wash. He earns \$8.40 per hour. Last week he worked  $x$  hours at this rate. Express his gross pay algebraically.

14. Lynn regularly works a 40-hour week and earns \$9 per hour. She receives time-and-a-half pay for each hour of overtime she works. Last week she worked 43 hours.

- What was her regular gross pay?
- What was her hourly overtime rate?
- What was her overtime pay?
- What was her total pay for the week?

15. Amy regularly works 20 hours per week at Pook's Dry Cleaners from Monday through Friday. She earns \$8.10 per hour and receives double-time pay for working Sundays. Next week she will work her regular 20 weekday hours, and an additional eight hours on Sunday. What will her total pay be for the week?

16. Tom earns \$12.50 per hour at the Yankee Bowling Alley. He regularly works 40 hours per week. He is paid time-and-a-half for each hour of overtime work. Last week he worked 42 hours. What was his gross pay for the week?

17. Pedro works 35 regular hours per week at the Meadow Deli. His hours over 35 are considered overtime. He earns \$9.20 per hour and receives time-and-a-half pay for each hour of overtime he works. Last week he worked 41 hours and received a gross pay of \$305.80. This amount is incorrect. How much does Pedro's boss owe him?

18. Colby and Cheryl work in different local supermarkets. Colby regularly earns \$8.90 per hour, and he is paid time-and-a-half for each hour of overtime he works. Cheryl regularly earns \$7.10 per hour, and she is paid double time for an hour of overtime. Who earns more for one hour of overtime? How much more?

19. Ron earns  $x$  dollars per hour. He regularly works 40 hours per week. Express his annual salary algebraically.

20. Michael earns \$10 per hour. He regularly works 40 hours per week. How many overtime hours would he have to work in a week for his overtime pay to be greater than his regular gross pay?

21. Jim worked 40 regular hours last week, plus 8 overtime hours at the time-and-a-half rate. His gross pay was \$1,248.

- What was his hourly rate?
- What was his hourly overtime rate?

22. Julianne works as a waitress. She earns \$5.90 per hour plus tips.

- Today she worked  $x$  hours. Express her pay for these hours algebraically.
- She served nine tables. The total bill for these nine tables was  $y$  dollars. Julianne received 18% in tips from these bills. Express the amount she received in tips algebraically.
- Express Julianne's total earnings for the day algebraically.

Don't Read!!

## Applications

*Never confuse the size of your paycheck with the size of your talent.*

Marlon Brando, Actor

1. Interpret the quote in the context of what you learned about jobs and salaries.
2. Yoko is paid semimonthly. How many fewer paychecks does she receive in a year compared to someone who is paid weekly?
3. Sean is paid biweekly. His annual salary is \$42,500. What is his biweekly salary to the nearest cent?
4. Cynthia's semimonthly salary is \$1,371.50. What is her annual salary?
5. Baseball player Alex Rodriguez earned \$27,708,525 in 2007. He played in 158 games. What was his salary per game to the nearest thousand dollars?
6. Ceil gets paid biweekly. Her biweekly salary is \$1,763.28. What is her annual salary?
7. John's weekly salary is \$478.25. His employer is changing the pay period to semimonthly.
  - a. What is John's annual salary?
  - b. What will John's semimonthly salary be to the nearest cent?
8. Ralph earns \$72,000 annually as an architect and is paid semimonthly. Alice also earns \$72,000 but she is paid biweekly.
  - a. How many more checks does Alice receive in a year when compared to Ralph?
  - b. What is the difference between Ralph's semimonthly salary and Alice's biweekly salary? Round to the nearest cent.
9. Last year Beth's annual salary was \$38,350. This year she received a promotion and now earns \$46,462 annually. She is paid biweekly.
  - a. What was her biweekly salary last year?
  - b. What is Beth's biweekly salary this year?
  - c. On a biweekly basis, how much more does Beth earn as a result of her promotion?
10. Justin is a golf pro. He works eight months per year, and is paid \$76,000. During the winter months, he teaches golf privately and earns another \$12,500. What is his average monthly salary based on his yearly earnings?
11. Last year Nancy's annual salary was  $x$  dollars. This year she received a raise of  $y$  dollars per year. She is paid semimonthly.
  - a. Express her semimonthly salary last year algebraically.
  - b. Express her semimonthly salary this year algebraically.
  - c. On a monthly basis, how much more does Nancy earn as a result of her raise?

### EXAMPLE 6

Samantha worked her 40 regular hours last week, plus 7 overtime hours at the time-and-a-half rate. Her gross pay was \$611.05. What was her hourly rate?

**SOLUTION** Let  $x$  represent the hourly rate. Her regular pay is  $40x$ . Her overtime pay is  $7(1.5x)$ .

$$\text{Regular pay} + \text{Overtime pay} = \text{Total pay}$$

Substitute.  $40x + 7(1.5x) = 611.05$

Simplify.  $40x + 10.5x = 611.05$

Combine like terms.  $50.5x = 611.05$

Divide each side by 50.5.  $x = 12.10$

Samantha's regular hourly rate is \$12.10.

### CHECK YOUR UNDERSTANDING

Jillian worked her 40 regular hours last week, plus 2 overtime hours at a double-time rate. Her gross pay was \$484. What was her hourly rate?

### EXAMPLE 7

Last week, Saul worked  $r$  regular hours and  $t$  overtime hours at a time-and-a-half rate. He earned \$700. If  $x$  represents his hourly rate, express  $x$  in terms of  $r$  and  $t$ .

**SOLUTION** Regular gross pay is  $rx$ . Total overtime pay is  $t(1.5x)$ .

$$\text{Regular pay} + \text{Overtime pay} = \text{Total pay}$$

Substitute.  $rx + t(1.5x) = 700$

Remove the parentheses.  $rx + 1.5tx = 700$

Factor out  $x$ .  $x(r + 1.5t) = 700$

Divide each side by  $(r + 1.5t)$ .  $x = \frac{700}{r + 1.5t}$

Saul's hourly rate can be represented by  $\frac{700}{r + 1.5t}$ .

### CHECK YOUR UNDERSTANDING

Jonathan worked  $h$  hours at an hourly rate of  $r$  dollars. He also worked  $w$  hours at an overtime rate of double time. Express his total pay for the week algebraically.

### EXTEND YOUR UNDERSTANDING

Jovanna gets paid a regular-pay rate of  $r$  dollars for 40 hours worked. She is paid at a time-and-a-half rate for up to 16 overtime hours worked and a double-time rate for any overtime hours worked greater than 16 hours. Write a piecewise function,  $p(z)$ , for Jovanna's pay when she works  $z$  hours.

**EXAMPLE 3**

- Maureen works at a local Chicken King restaurant. Her regular hourly wage is \$9.70. If she regularly works 40 hours per week, what is her regular weekly pay?
- SOLUTION** Multiply the hours worked by the hourly wage.  
$$9.70 \times 40 = 388$$
- Maureen's regular weekly pay is \$388.

**■ CHECK YOUR UNDERSTANDING**

Roger regularly works  $h$  hours per week at a rate of  $d$  dollars per hour. Express his annual salary algebraically.

**EXAMPLE 4**

- If Maureen from Example 3 works overtime, she receives an hourly rate of  $1\frac{1}{2}$  times her regular hourly rate. What is Maureen's hourly overtime rate?
- SOLUTION** Multiply her hourly rate by  $1\frac{1}{2}$ , which is 1.5 as a decimal.  
$$9.70 \times 1.5 = 14.55$$
- Maureen's hourly overtime rate is \$14.55.

**■ CHECK YOUR UNDERSTANDING**

If Mary Ann earns  $y$  dollars per hour regularly, express her hourly overtime rate algebraically if she is paid time-and-a-half.

**EXAMPLE 5**

- Janice earns \$10 per hour. If her regular hours are 40 hours per week, and she receives time-and-a-half overtime, find her total pay for a week in which she works 45 hours.

**SOLUTION**

- Find her regular pay for the 40 regular hours.  
$$40 \times 10 = 400$$
- Subtract to find the number of overtime hours.  
$$45 - 40 = 5$$
- Her overtime rate is 1.5 times the hourly rate.  
$$10 \times 1.5 = 15$$
- Multiply the overtime hourly rate by the number of overtime hours to find the overtime pay.  
$$15 \times 5 = 75$$
- Add her regular pay to her overtime pay.  
$$400 + 75 = 475$$
- Janice earned \$475 for her 45 hours of work.

**■ CHECK YOUR UNDERSTANDING**

Ron regularly works 40 hours per week, at a rate of  $x$  dollars per hour. Last week he worked  $y$  overtime hours at time-and-a-half. Express his total weekly salary algebraically.

Certain jobs, whether full- or part-time, require the employee work a specific number of hours per week. These are the employee's **regular hours**. Employees may work more hours than their regular hours. These extra hours are called **overtime hours**. The **overtime hourly rate** is usually greater than the hourly rate for the regular hours. Often the overtime rate is  $1\frac{1}{2}$  times the regular hourly rate, called **time-and-a-half overtime**. Sometimes the overtime rate is 2 times the hourly rate, called **double-time pay**. Your total pay, which is the sum of your hourly pay and your overtime pay, is your **gross pay**.

There are federal and state laws on the lowest hourly rate that can be paid to an employee in the United States. This rate is the **minimum wage**. Other laws involve the number of hours employees can work, and conditions in the workplace. It is important to have a clear understanding of your rights and responsibilities as an employee.

## Skills and Strategies

Here you will learn how to make computations involving different pay periods and hourly rates. When you take a job, be sure to ask about everything you need to know regarding your paycheck.

### EXAMPLE 1

- Christina is paid biweekly. Her annual salary is \$37,000. What is her biweekly salary, rounded to the nearest cent?
- SOLUTION** There are 26 biweekly paychecks per year. Christina divides her annual salary by the number of paychecks to compute her weekly salary.  
$$37,000 \div 26 = 1,423.08$$
- Christina earns \$1,423.08 per biweekly pay period.

### CHECK YOUR UNDERSTANDING

Carlos earns  $x$  dollars biweekly. Express his annual salary algebraically.

### EXAMPLE 2

Manny is paid semimonthly. His semimonthly salary is \$1,239. What is his annual salary?

- SOLUTION** Manny receives 24 paychecks per year. He multiplies the monthly amount by the number of paychecks to calculate his annual salary.

$$1,239 \times 24 = 29,736$$

Manny's annual salary is \$29,736.

### CHECK YOUR UNDERSTANDING

Alex is paid semimonthly. His annual salary is  $y$  dollars. Express his semimonthly salary algebraically.

*Never confuse the size of your paycheck with the size of your talent.*

Marlon Brando, Actor

# Pay Periods and Hourly Rates

## Objectives

- Compute weekly, semimonthly, and biweekly earnings given annual salary.
- Compute hourly pay and overtime pay given hourly rate.

## Key Terms

- weekly
- biweekly
- semimonthly
- monthly
- direct deposit
- hourly rate
- regular hours
- overtime hours
- overtime
- gross pay
- minimum wage

## WHAT DO YOU NEED TO KNOW TO MAKE SURE EACH PAYCHECK IS CORRECT?

Everybody looks forward to payday. Most high school students are paid on a **weekly** basis, which means they receive 52 paychecks per year. Their paydays usually fall on the same day each week. However, not all jobs have a pay period of one week.

Some employees receive a paycheck every two weeks. They receive 26 paychecks per year. These people are paid **biweekly**. Their paydays fall on the same day of the week. Businesses that distribute paychecks biweekly save time, money, and paperwork, when compared with businesses that pay their employees weekly.

Some businesses pay their employees twice a month, or **semimonthly**. There are 12 months in a year, so these employees receive 24 paychecks per year. The paychecks are distributed on the same dates each month. For example, an employer may choose to pay employees on the 1st and 15th of each month. Note that biweekly and semimonthly payment schedules are slightly different.

Although it is not common, some businesses pay their employees **monthly**. These employees receive 12 paychecks per year. They are usually paid on the same date of each month, for example, the 15th.

Most employers offer their employees **direct deposit**. This means their paycheck amounts are automatically deposited electronically into their bank accounts on payday.

Most part-time jobs that students hold pay a set amount for each hour they work, called the **hourly rate**. Many people in full-time jobs also are paid at an hourly rate.