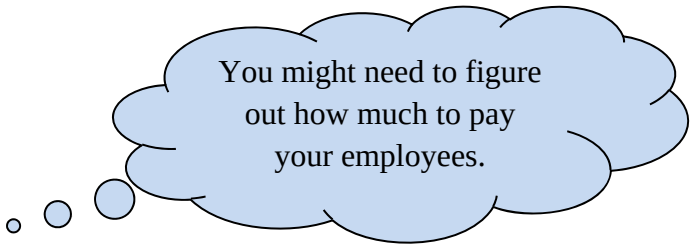


Business Mathematics
Class notes
Gross Earnings: Wages and Salaries (section 6.1)

We will see many ways employees get paid. This section will cover some basic formulas as well as some specific terminology. Let's start with these two words we will see a lot.

Definition: Wage: a rate of pay expressed as a certain amount of money per hour

Definition: Salary: a fixed amount of money per pay period

We will be talking about net and gross pay, deductions, rates of pay, shift differentials, etc. so let's get some basics down first.

Definition: Gross earnings: total amount earned without deductions such as taxes, union dues, etc.

Often, we will use the following formula.

Gross Earnings = Number of hours worked × Rate per hour

Definition: Net pay: the amount the employee actually receives in their paycheck. We have the following formula.

Net Pay = Gross Earnings – Deductions

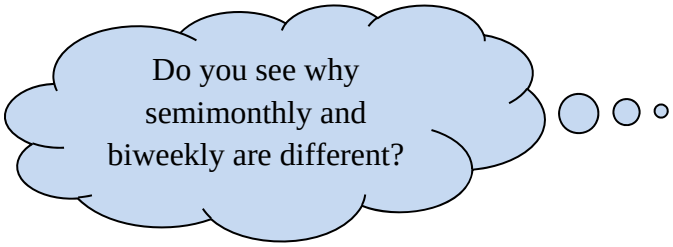
Overtime:
Sometimes, overtime is paid. The idea is that you would get paid "time-and-a-half" for every hour you worked over 40 hours in a single week. Or possibly, your overtime kicks in when you work more than 8 hours in a single day. The overtime rate of pay is figured by multiplying 1.5 times the regular hourly rate.

Definition: Overtime earnings: the money earned at the overtime rate of pay

expl 1: Jenny earns $12 an hour for babysitting but she gets paid "time-and-a-half" if she needs to stay longer than usual.
a.) What is her overtime rate of pay? Do *not* forget a dollar sign.

b.) If Jenny is made to stay late 1.5 hours, what will her overtime earnings be?

Common Pay Periods:
Some people get paid every month while others get paid twice a month. Did you know there is a difference between getting paid semimonthly (twice a month) and biweekly (every two weeks)? Here are the common pay periods and what they mean for the whole year. We will need to convert among them.



Common Pay Periods	
Monthly	12 paychecks per year
Semimonthly	24 paychecks per year
Biweekly	26 paychecks per year
Weekly	52 paychecks per year

If John gets paid $1300 per week, what is his equivalent monthly rate? It's *not* $1300 × 4! Why not? We will see later.

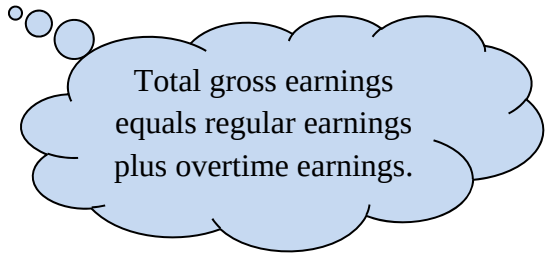
The book also discusses **double time** (twice the hourly rate), **shift differentials** (compensation for less desirable hours), **split-shift premiums** (compensation for a schedule of, as an example, eight hours on the clock with a four-hour, unpaid break in the middle), or **compensatory (comp) time** (instead of getting paid for overtime hours, you merely get time off in your regular shift). These concepts do *not* show up a lot in the homework though.

expl 2: Considering the previous week's work schedule below, find the number of regular hours and overtime hours (any hours over 40) for this employee. If her regular rate of pay is $9.50 per hour, calculate her overtime rate (time-and-a-half). Include appropriate units.

Name	**S**	**M**	**T**	**W**	**Th**	**F**	**S**
Scholz, K.	8.5	9	7.5	8	10	8.25	--

expl 3: For the employee listed here, find the overtime rate, the amount of earnings at regular pay, the amount of overtime earnings, and the total gross wages.

Taylor, O. worked 40 regular hours and 6.75 hours of overtime. His regular rate of pay is $12.08 per hour.

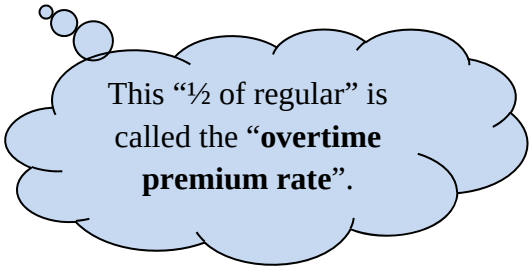


Overtime Premium Method:
This is simply another method to calculate the same thing. The idea is that you pay the employee the regular rate for *all* hours worked (called **straight-time earnings**). Then you add to that, what they call the "**overtime premium**". This is found by multiplying the overtime hours worked times ½ the regular rate of pay.

expl 4: Let's try this overtime premium method with Taylor, O. from the previous example. We'll go step-by-step.
a.) How many hours *total* did he work?

b.) Find the "straight-time earnings" by multiplying the *total* number of hours worked by the regular rate of pay.

c.) Find ½ the regular rate of pay. Multiply that by the 6.75 hours he worked overtime to calculate the "overtime premium".



d.) Add parts *b* and *c* to find the gross earnings. Did your answer match what we got before?

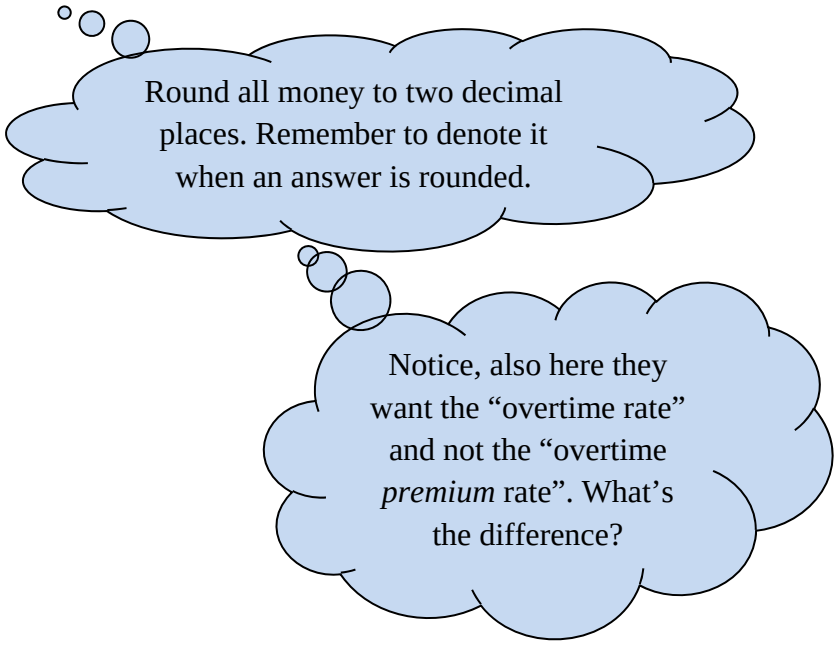
Daily Overtime:

Some companies pay overtime if an employee works more than eight hours in a single day, not more than 40 hours in a week. Here, we have to figure out, for each day, if overtime pay is warranted. You can assume that overtime is paid at time-and-a-half.

expl 5: Some companies pay overtime for all time worked over 8 hours in a given day. Use this method to complete the following payroll ledger. Overtime is paid at time-and-a-half. The employee's regular rate of pay is $9.85 per hour.

Name	S	M	T	W	Th	F	S
Campbell, C.	--	9	8.75	7	8.5	10	--

Total Hours				Gross Earnings		
Regular	Overtime (O.T.)	Reg. Rate	O.T. Rate	Regular Earnings	O.T. Earnings	Total Earnings
		$9.85				



Overtime for Salaried Employees:
A salaried employee must be compensated for overtime worked but they do *not* have an hourly wage like we have seen in previous examples. Or do they?...

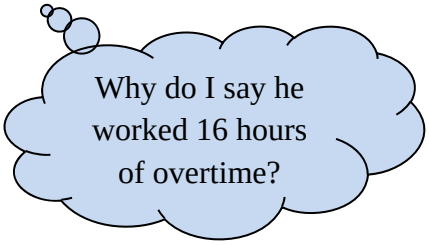
expl 6: Find the weekly gross earnings for the following person who is on salary and normally works a 40-hour week. Overtime is paid at time-and-a-half. Follow the steps.

Johnson, J. has a weekly salary of $520. This week he worked 56 hours.

a.) First, figure out the equivalent hourly wage for a 40 hour week. If he normally gets paid $520 for 40 hours of work, then what is his hourly wage?

b.) Once you have an hourly wage for J. Johnson, find the overtime rate as before.

c.) Lastly, give him his hourly wage for the first 40 hours he worked and the overtime wage for the 16 hours of overtime. Add it up to find his salary this week.



Equivalent Earnings for Different Pay Periods:
Returning to the pay periods from page 2, we see here how they are related to each other. I asked, "If John gets paid $1300 per week, what is his equivalent monthly rate?" Let's think about it.

At first glance, you might think that we can just take $1300 and multiply by 4 to get the monthly rate. But the problem is that there really are *not* four weeks in a month, are there? Not exactly, really … right? We will work an example to show the correct procedure.

expl 7: Find the equivalent earnings for the salary listed below. Follow the steps. Include dollar signs.

Weekly	Biweekly	Semimonthly	Monthly	Annual
$830				

a.) Biweekly is straight-forward. If they get paid $830 every week, then how much do they make every two weeks? Go with your gut here.

b.) Let's skip to annual. If they get paid $830 a week and there are 52 weeks in a year, then how much is the equivalent annual salary? Go with your gut.

c.) Next, I figure the monthly salary. But again, you *cannot* start with a weekly salary and multiply by 4, as discussed above. So take the annual salary and divide by 12 months per year to get a monthly equivalent.

d.) Lastly, semimonthly means twice a month, or 24 times a year. The most straight forward method is to take the annual salary and divide by 24.