# Money and income slide deck

Mathematics 10-3

## Unit N: Money and income

# Unit price and the better buy

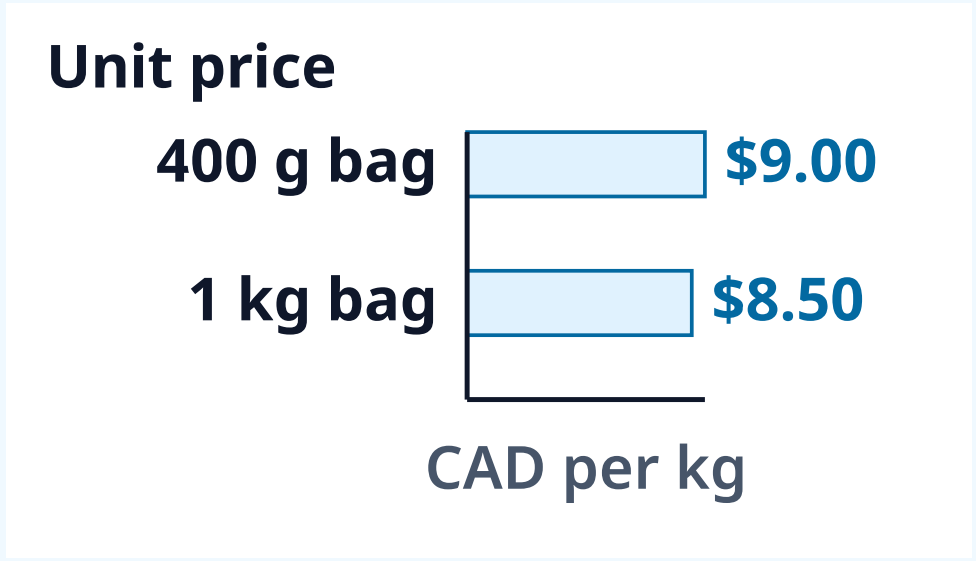
# Two rice bags on a grocery shift

- A grocery clerk sets a 400 gram bag of rice at 3.60 dollars beside a 1 kilogram bag at 8.50 dollars.
- The smaller shelf price can look like the bargain until both bags are priced per kilogram.



## Unit price and price change

- Unit price divides cost by quantity after both packages use one unit, such as dollars per kilogram or dollars per litre.
- A best buy weighs that unit price together with quality and with how much of the package will be used.
- Percent change uses the original price as the base, and a sales promotion may hide the same unit price inside a smaller printed unit.



# Key terms

### Unit price

The cost of one shared unit, found by dividing the price by the quantity. (price / quantity)

### Best buy

The purchase that fits the unit price and the amount the buyer can actually use.

### Percent change

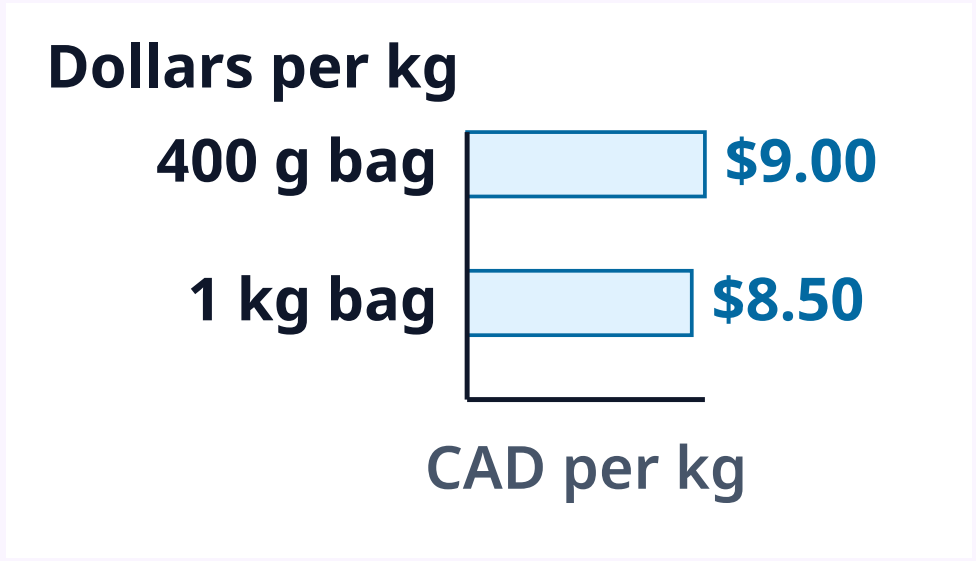
The price gap divided by the original price, then multiplied by 100 to name a percent increase or a percent decrease. ((new - original) / original × 100%)

### Sales promotion

A store offer such as a multi-can deal, a percent-off tag, or a price written per 100 grams.

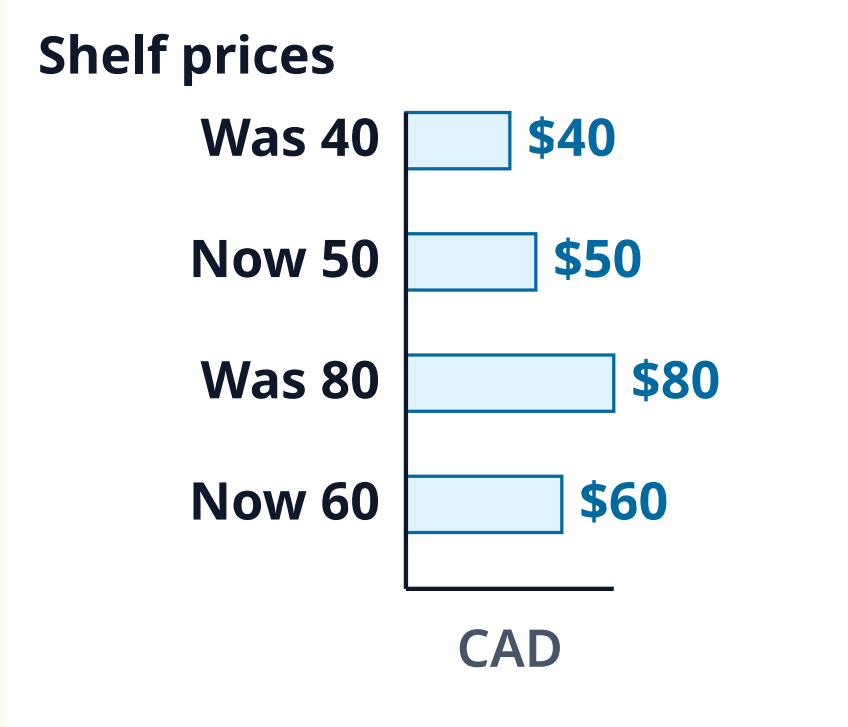
## Rice bags in dollars per kilogram

- The 400 gram bag is 400 divided by 1000, which equals 0.4 kilograms, and 3.60 divided by 0.4 equals 9.00.
- The 1 kilogram bag is 8.50 divided by 1, which equals 8.50 dollars per kilogram, so the larger bag has the lower unit price.
- When the household can use only 400 grams before the rest spoils, the 3.60 dollars bag can still be the better buy.



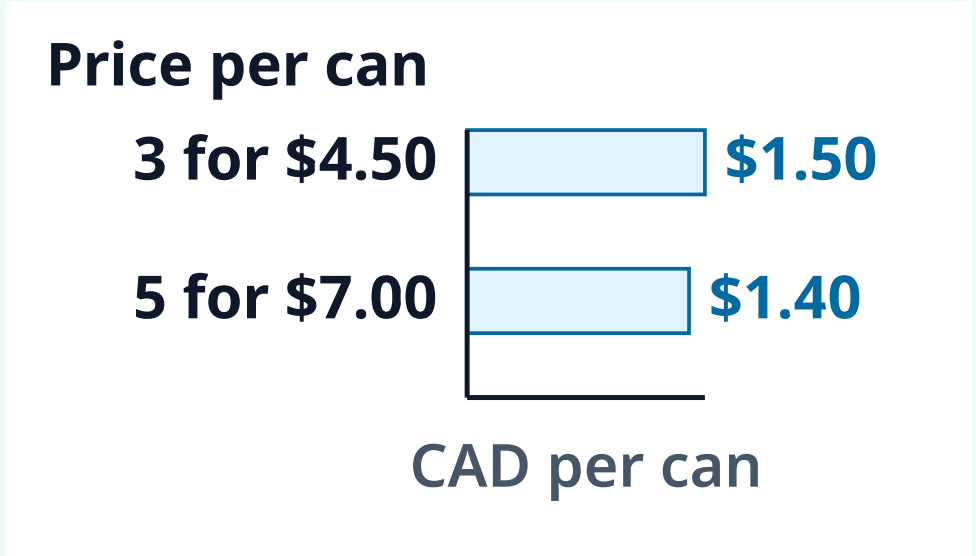
# Percent increase and decrease

- Percent change equals the price gap divided by the original price, times 100%.
- From 40 dollars to 50 dollars the gap is 10, and 10 divided by 40 equals 0.25, a 25% increase.
- From 80 dollars to 60 dollars the gap is 20, and 20 divided by 80 equals 0.25, a 25% decrease.



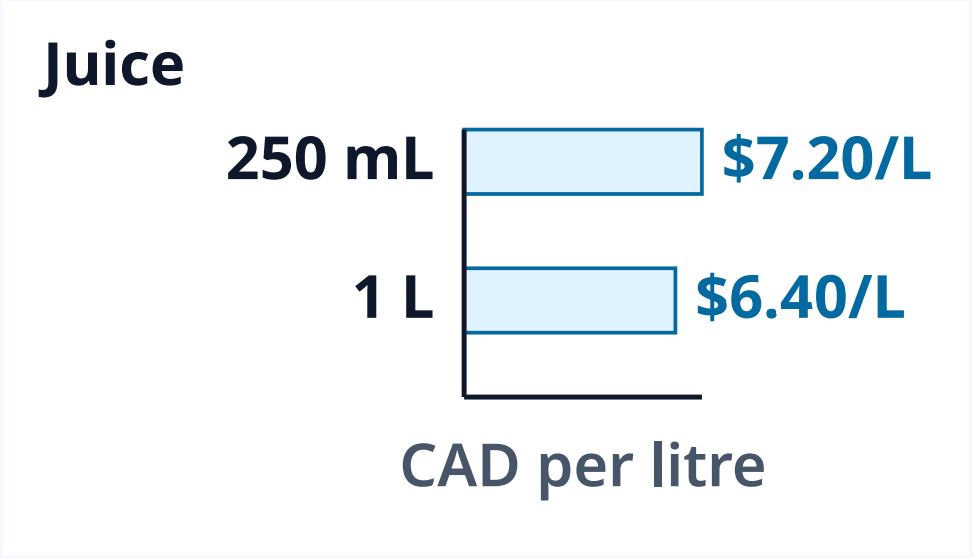
## Three cans or five cans

- A sales promotion can sell three cans for 4.50 dollars or five cans for 7.00 dollars.
- Three cans at 4.50 dollars cost 1.50 dollars each, because 4.50 divided by 3 equals 1.50.
- Five cans at 7.00 dollars cost 1.40 dollars each, because 7.00 divided by 5 equals 1.40.



## Small-print units and a juice bottle

- Deli meat at 2 dollars per 100 grams is 2 divided by 0.1, which equals 20 dollars per kilogram.
- That matches a tag that already reads 20 dollars per kilogram.
- Juice at 250 millilitres is 0.25 litres.
- Dividing 1.80 by 0.25 equals 7.20 dollars per litre.
- A 1 litre bottle at 6.40 dollars costs 6.40 dollars per litre.
- A brush that moves from 48 dollars to 36 dollars falls by 12, and 12 divided by 48 equals a 25% decrease.



# Shelf price check

- Find the unit price of each rice bag and name the bag with the lower unit price.
- State the percent change from 40 dollars to 50 dollars and say whether it is an increase.



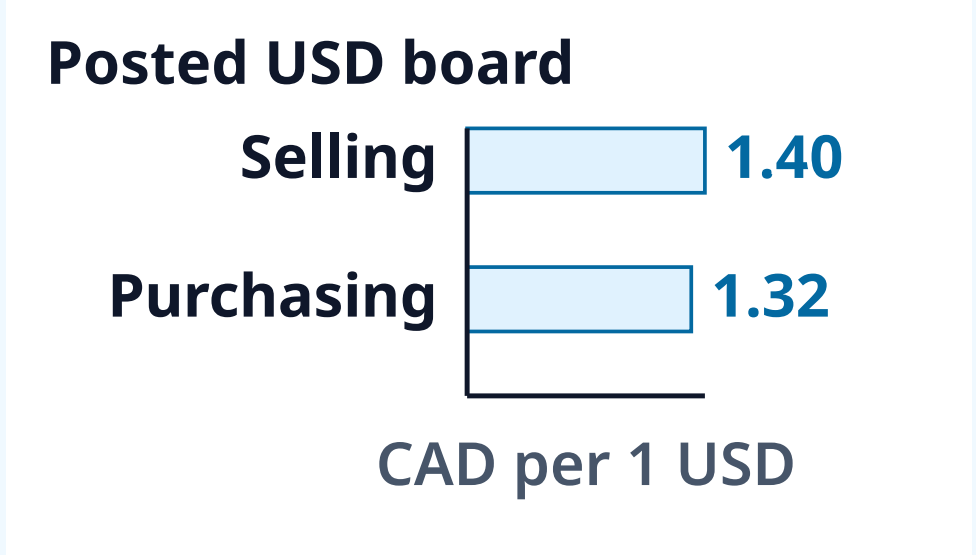
Mathematics 10-3

## Unit N: Money and income

# Currency exchange at the posted rate

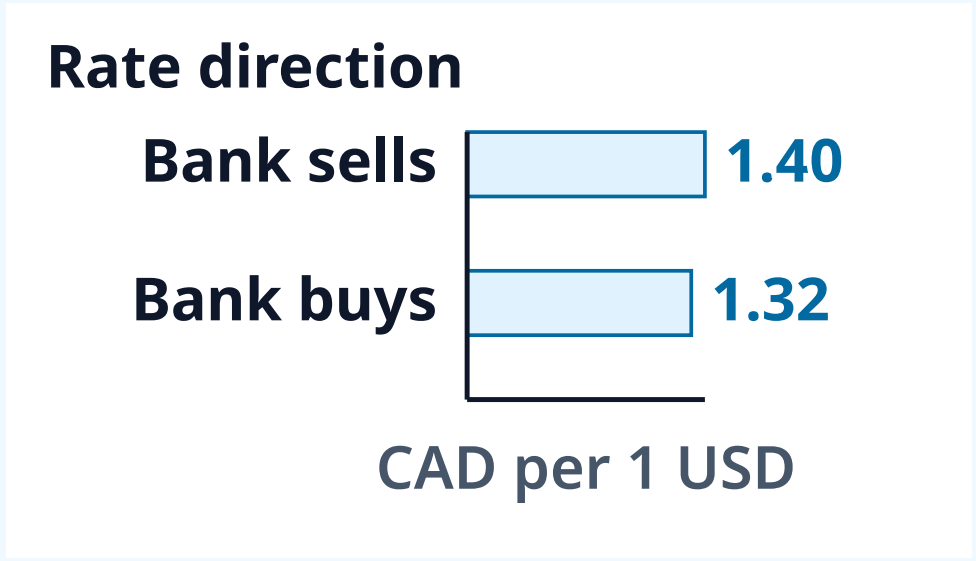
# A posted board before a trip

- A teller trainee reads a posted sample board: the bank sells 1 USD for 1.40 CAD and buys 1 USD for 1.32 CAD.
- A customer who wants 50 US dollars pays at the selling rate.
- Selling those dollars back uses the purchasing rate.



## Buying and selling rates

- The selling rate is the rate the institution uses when it sells foreign currency to the customer.
- The purchasing rate is the rate the institution uses when it buys foreign currency from the customer.
- Currency exchange multiplies the foreign amount by the rate for that direction, and a rate table shows that multiplication in two columns.



# Key terms

### Selling rate

The rate the institution uses when it sells foreign currency to the customer. The customer pays this many Canadian dollars per one foreign unit. (CAD per 1 foreign unit)

### Purchasing rate

The rate the institution uses when it buys foreign currency from the customer. The customer receives this many Canadian dollars per one foreign unit. (CAD per 1 foreign unit)

### Currency exchange

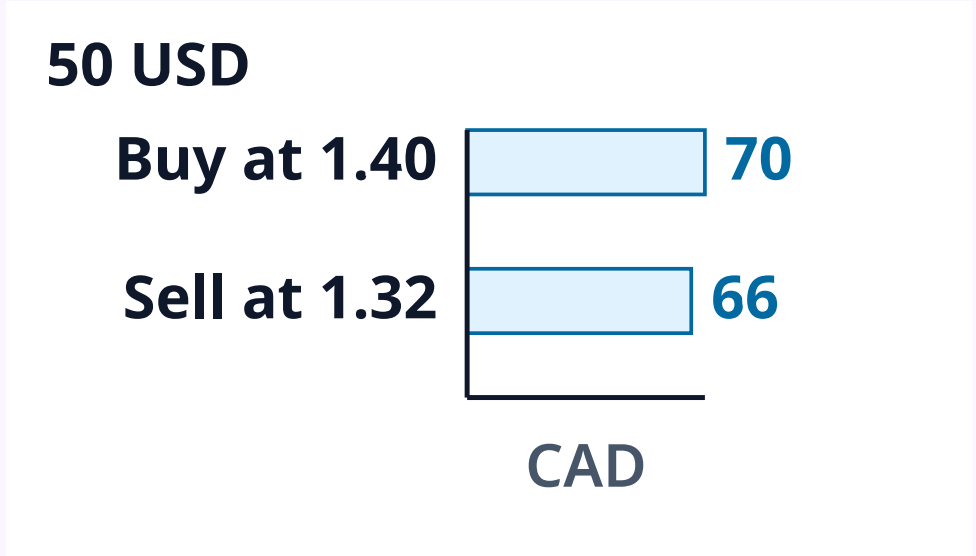
A conversion between Canadian dollars and a foreign currency by multiplying by the rate for that direction.

### Rate table

A two-column chart that lists a foreign amount beside the Canadian dollars for that amount at one stated rate.

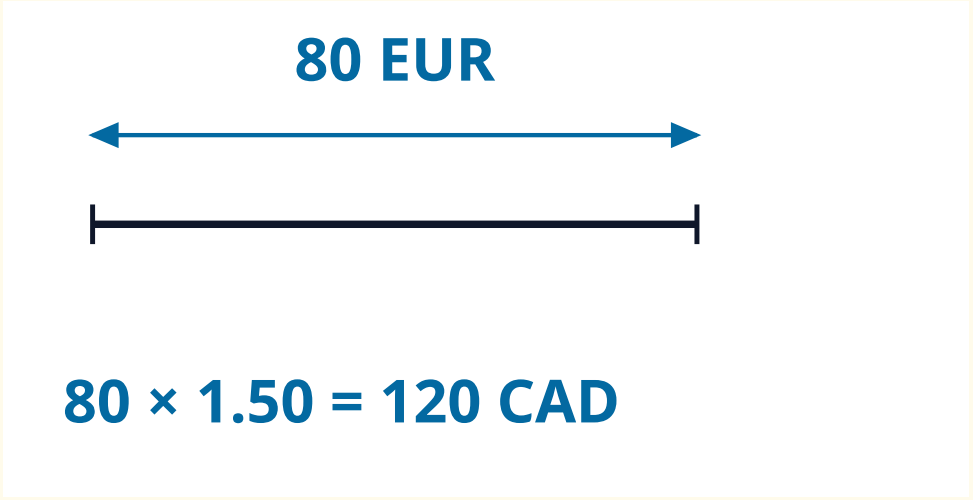
# Fifty US dollars out and back

- Buying 50 USD at the selling rate 1.40 costs 50 times 1.40, which equals 70 CAD.
- Selling 50 USD back at the purchasing rate 1.32 yields 50 times 1.32, which equals 66 CAD.
- The gap of 70 minus 66, which equals 4 CAD, is the institution’s margin on that round trip.



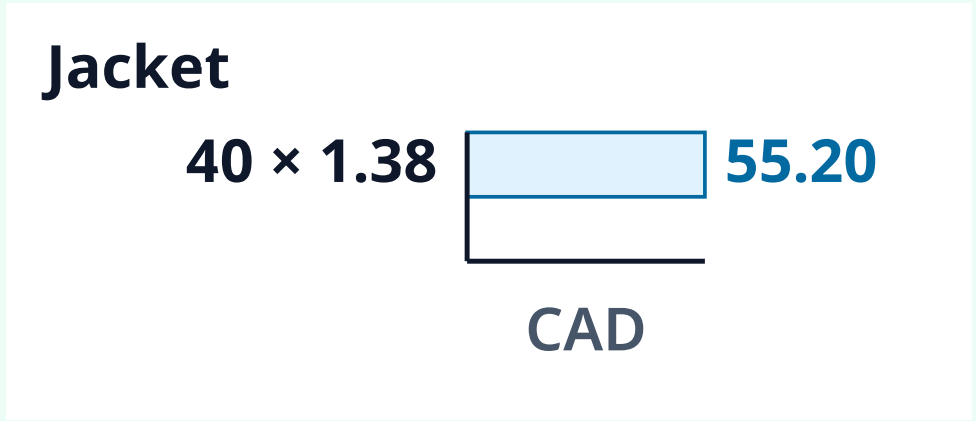
# Eighty euros at a selling rate of 1.50

- A selling rate of 1.50 CAD per EUR means each euro costs 1.50 Canadian dollars.
- Eighty euros cost 80 times 1.50.
- Multiplying 80 by 1 equals 80, multiplying 80 by 0.50 equals 40, and 80 plus 40 equals 120 CAD.



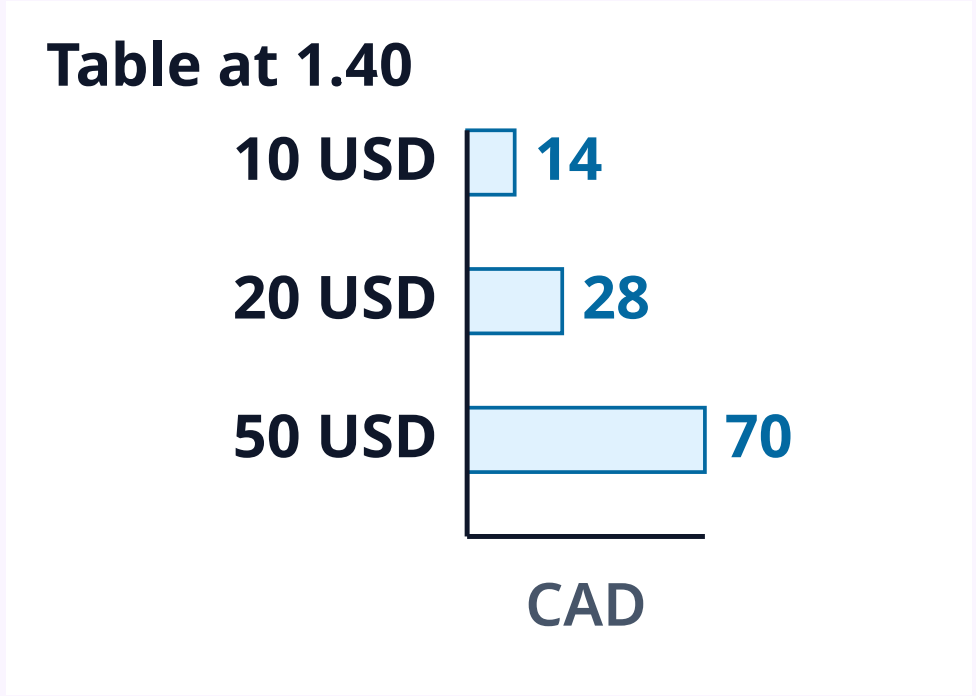
# A jacket priced in US dollars

- A jacket costs 40 USD and the selling rate for this question is 1.38 CAD per USD.
- Forty times 1.38 equals 55.20, so the jacket costs 55.20 CAD.
- A purchasing rate of 1.30 would price the jacket as if the customer were selling USD to the bank.



## Estimating with a rate table

- While abroad, round the selling rate and multiply before you pay, so a 1.40 rate stays 1.4 times the foreign price in CAD.
- Ten times 1.40 equals 14, twenty times 1.40 equals 28, and fifty times 1.40 equals 70.
- Those rows price 10 USD at 14 CAD, 20 USD at 28 CAD, and 50 USD at 70 CAD.
- Rounding 1.38 to 1.40 gives 40 times 1.40.
- Forty times 1 equals 40 and 40 times 0.40 equals 16, so the estimate is 56 CAD.



# Board check at the counter

- Find the cost of 50 USD at the selling rate 1.40 and the receipt from selling 50 USD at the purchasing rate 1.32.
- Find the cost of 80 EUR at a selling rate of 1.50.



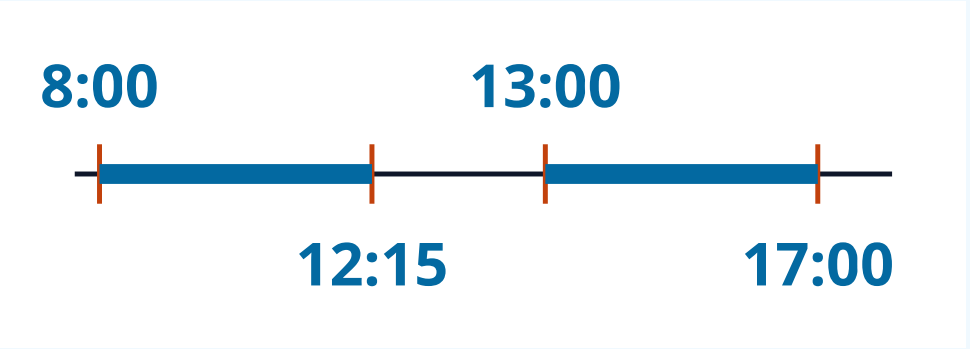
Mathematics 10-3

## Unit N: Money and income

# Methods of earning income

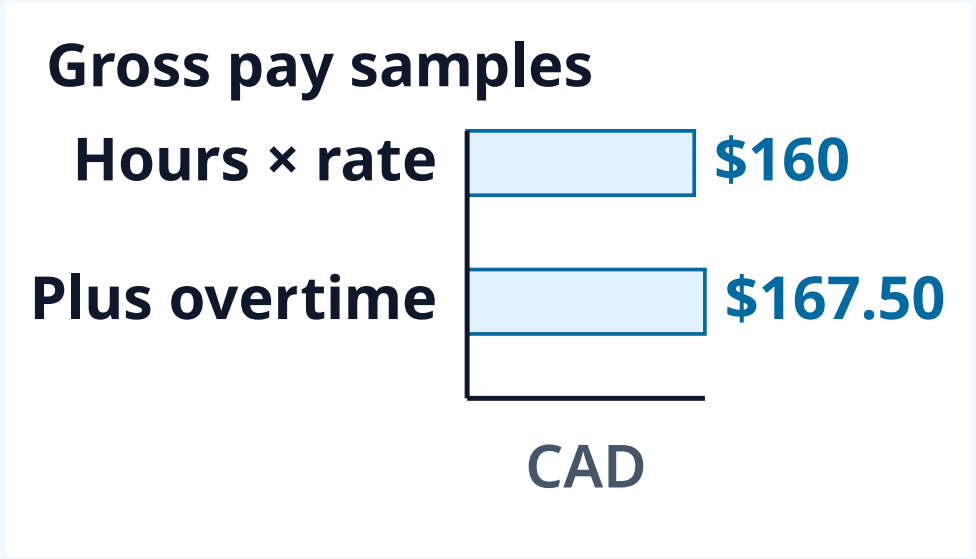
# A time clock and a tip jar

- A welding apprentice clocks 8:00 to 12:15 and 13:00 to 17:00, and a server on another shift counts a wage plus tips.
- The earning method decides which numbers enter the pay: hours, sales, finished pieces, or one contract price.



## Methods of earning income

- Methods of earning include hourly wage, wage plus tips, salary, commission, contract, piecework, bonus, and shift premium.
- A welder is paid an hourly wage, and a server is paid a wage plus tips.
- A salesperson earns commission, and office staff earn a salary.
- Roofing pays by contract, sewing pays by piecework, and a night shift adds a premium.
- Straight-time gross pay uses hours times the hourly rate.
- Overtime pay uses time and a half or double time on the extra hours.



# Key terms

### Hourly wage

Pay that counts each hour worked, including overtime hours at the overtime factor the job states.

### Overtime

Hours beyond the stated threshold, paid at time and a half or at double time.

### Commission

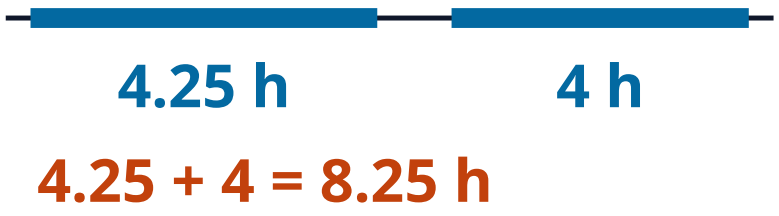
Pay that is a percent of sales, either as a single rate or as a base plus that percent.

### Gross pay

The pay counted from the earning method before the deductions on a later stub. (hours × rate for straight time)

## A time card in decimal hours

- From 8:00 to 12:15 is 4 hours 15 minutes, and 15 divided by 60 equals 0.25, so that block is 4.25 hours.
- From 13:00 to 17:00 is 4 hours, and 4.25 plus 4 equals 8.25 hours on the card.
- Fifteen minutes is 0.25 hour because 60 minutes equal 1 hour, while 0.15 hour is 9 minutes.



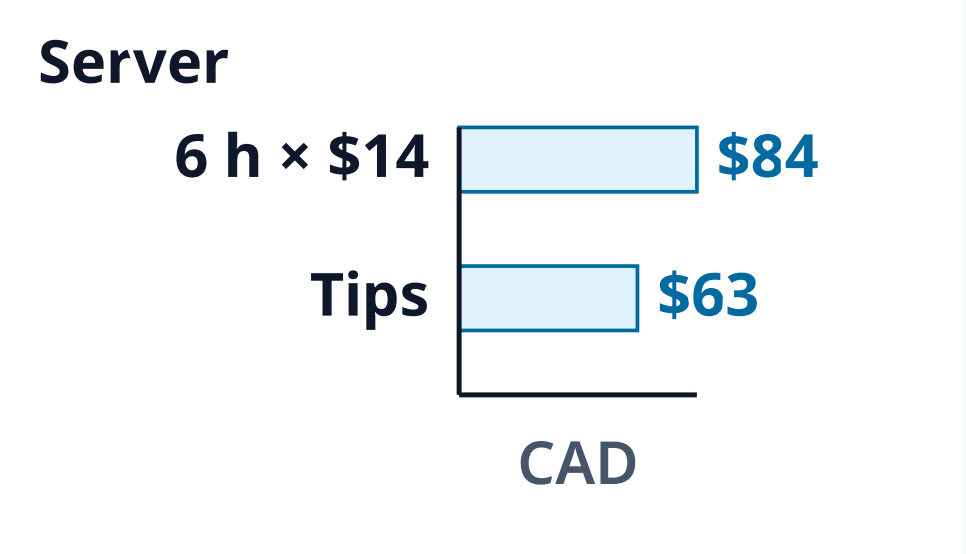
## Time and a half after eight hours

- The rate is 20 dollars per hour, with overtime after 8 hours at time and a half.
- Regular pay is 8 times 20, which equals 160.
- Overtime pay starts with 0.25 times 20, which equals 5.
- Then 5 times 1.5 equals 7.50.
- Add 160 and 7.50 to get a gross pay of 167.50.



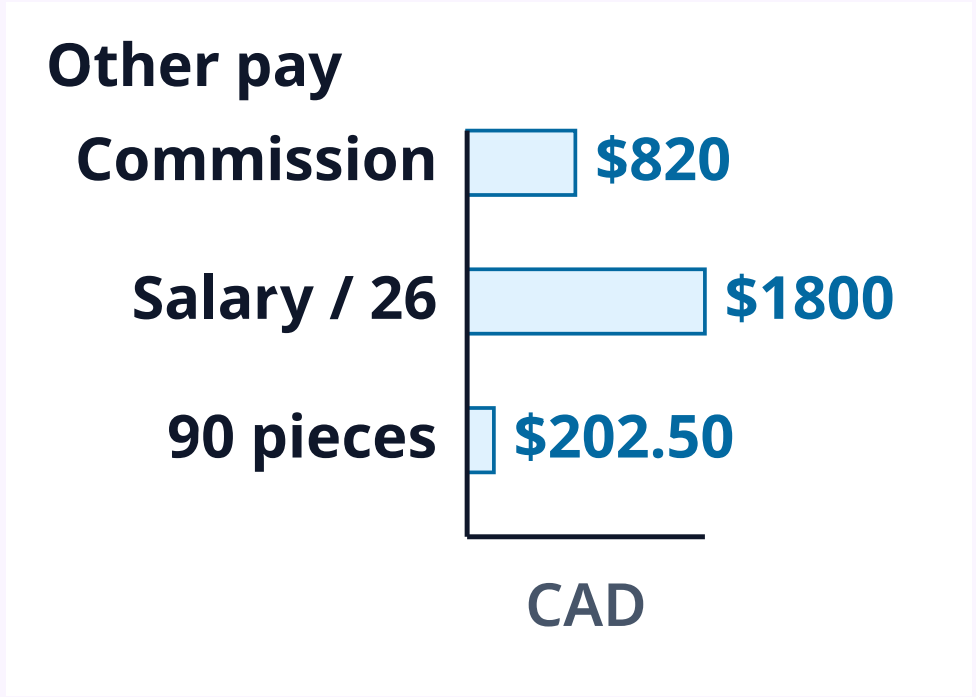
# A server’s wage plus tips

- A server works 6 hours at 14 dollars and receives 63 dollars in tips.
- The wage is 6 times 14, which equals 84 dollars.
- Gross pay is 84 plus 63 in tips, which equals 147 dollars.



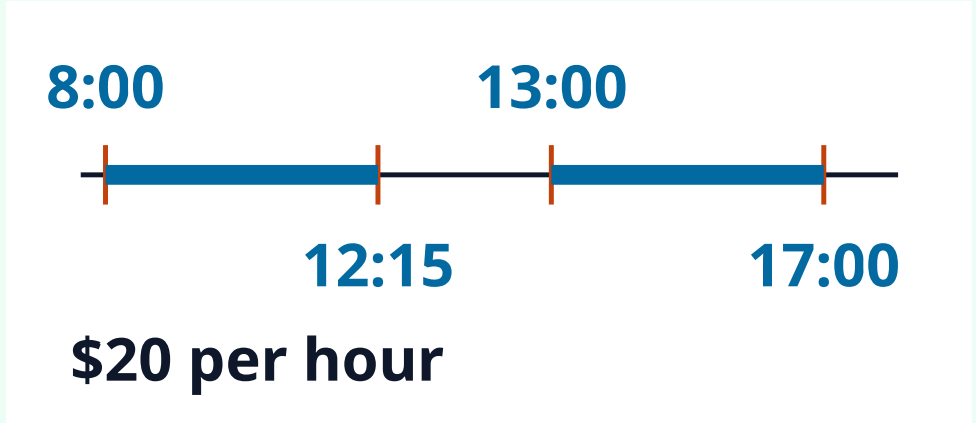
## Salary and commission

- Double time for 5 hours at 18 dollars starts with 5 times 18, which equals 90.
- Then 90 times 2 equals 180 dollars of double-time pay.
- Four percent of 8000 dollars is 0.04 times 8000, which equals 320.
- A base of 500 dollars plus 320 equals 820.
- Six percent of 3500 dollars is 0.06 times 3500, which equals 210.
- Dividing 46800 dollars by 26 gives 1800, dollars because 26 times 1800 equals 46800.
- Ninety pieces at 2.25 dollars start with 90 times 2, which equals 180, and 90 times 0.25 equals 22.50.
- Adding 180 and 22.50 equals 202.50 dollars.
- A painting contract of 1800 dollars is the gross pay for that job.



# Card and formula check

- Write the welder card as a decimal number of hours.
- Find the gross pay for 8.25 hours at 20 dollars with over-time after 8 hours at time and a half.



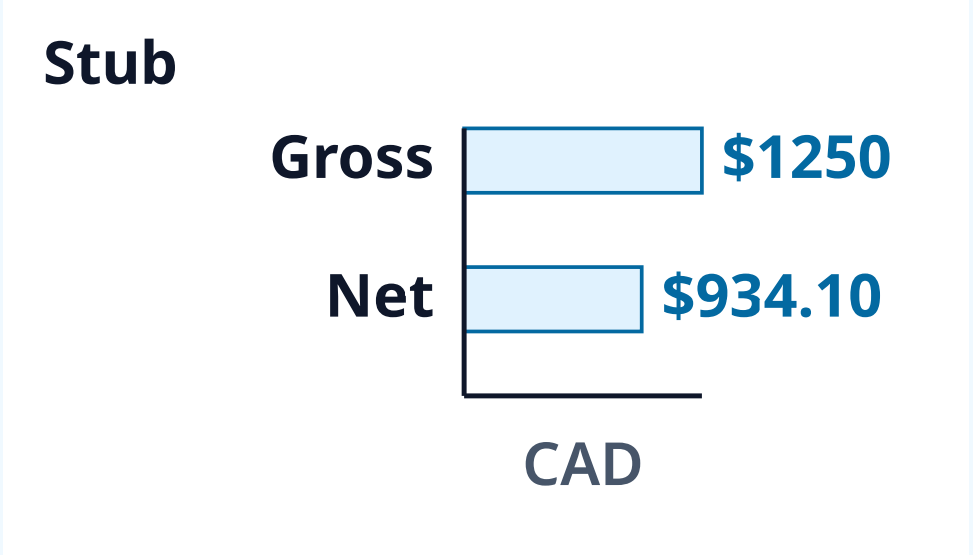
Mathematics 10-3

## Unit N: Money and income

# Gross pay and net pay

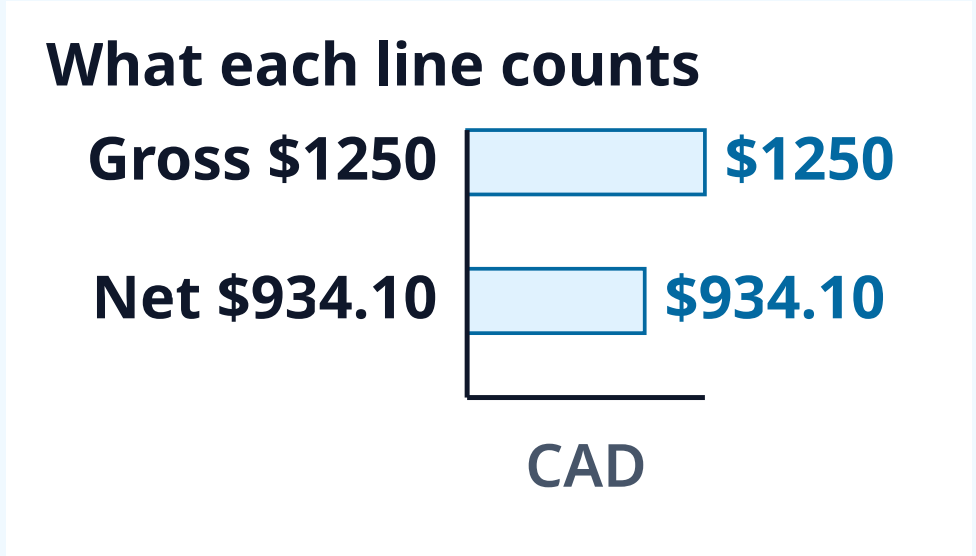
# The deposit is the last line

- A co-op student opens a pay stub whose top line is gross pay of 1250 dollars.
- The deposit matches the last line, after the stub's given deductions have been subtracted one at a time.



# What gross pay and net pay count

- Gross pay counts the pay before the listed deductions.
- Net pay counts the pay after those listed deductions have been subtracted.
- The CPP, EI, income tax, and health plan figures in this lesson are the amounts the question gives on the stub.



# Key terms

### Gross pay

The pay counted before the listed deductions are subtracted.

### Net pay

The pay counted after the listed deductions have been subtracted.

### Deduction

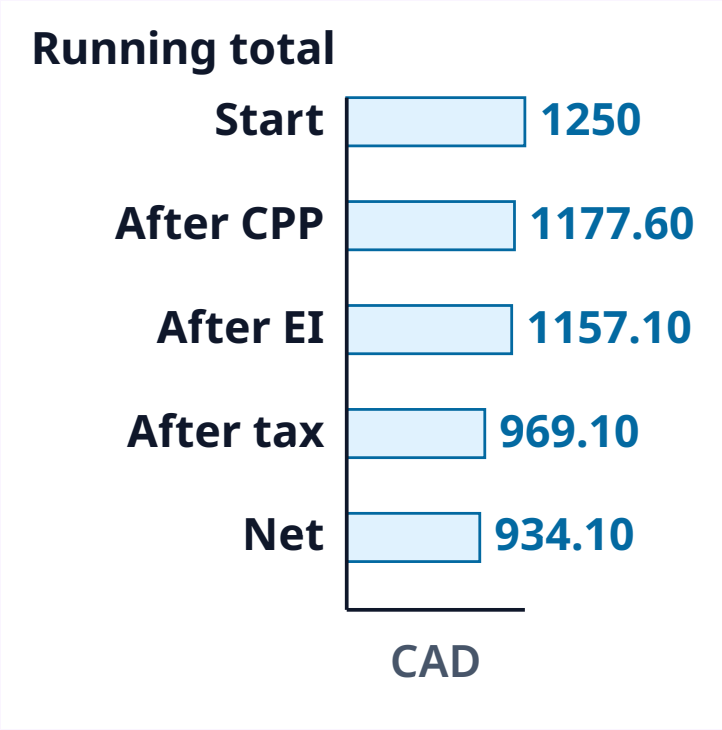
An amount the question lists to subtract from gross pay, such as the given CPP, EI, income tax, or health plan figure.

### Pay stub

The slip that lists gross pay, each given deduction, and the net pay that remains.

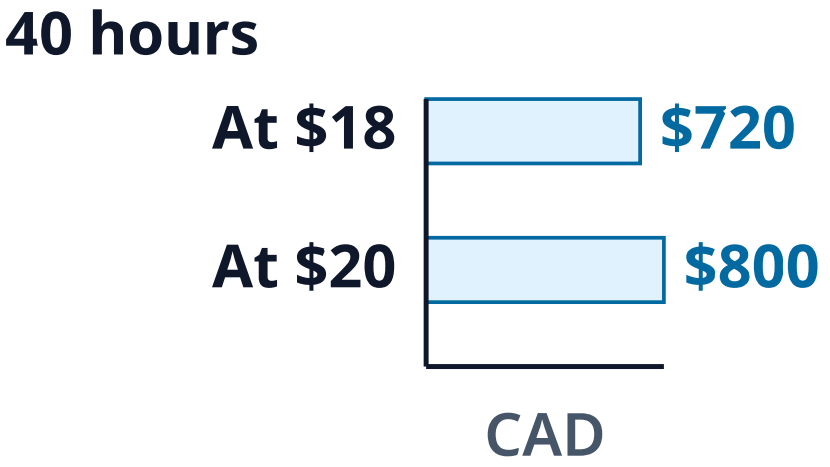
## A running total down the stub

- Start at gross pay 1250 dollars and subtract CPP 72.40 dollars.
- That 1250 minus 72.40 equals 1177.60.
- Subtract EI 20.50 dollars.
- That 1177.60 minus 20.50 equals 1157.10.
- Subtract income tax 188 dollars.
- That 1157.10 minus 188 equals 969.10.
- Subtract the health plan 35 dollars.
- That 969.10 minus 35 equals 934.10.
- Net pay on this stub is 934.10 dollars.



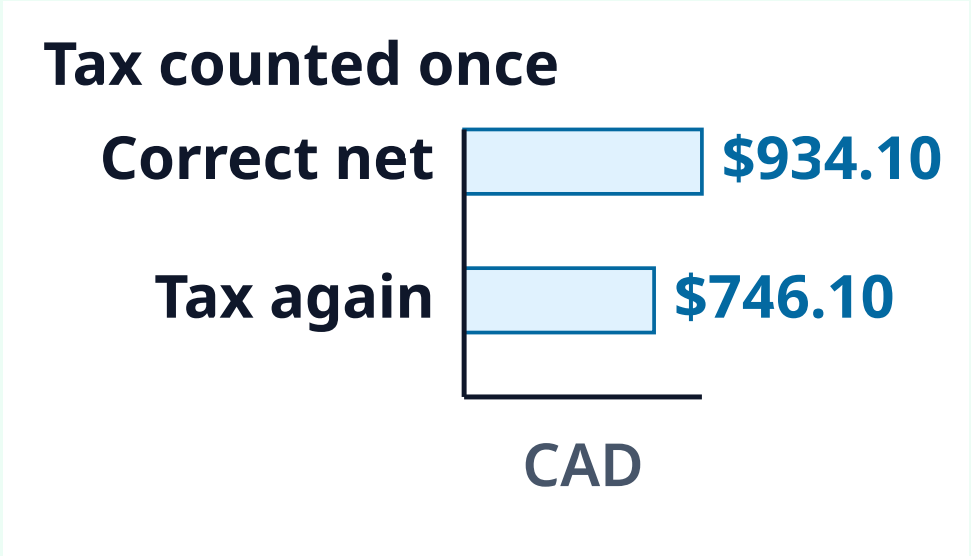
# A what-if on the hourly rate

- A simple table compares 40 hours at 18 dollars with 40 hours at 20 dollars.
- Multiplying 40 by 18 equals 720, and multiplying 40 by 20 equals 800.
- The gross rises by 800 minus 720, which equals 80, before any deduction change.



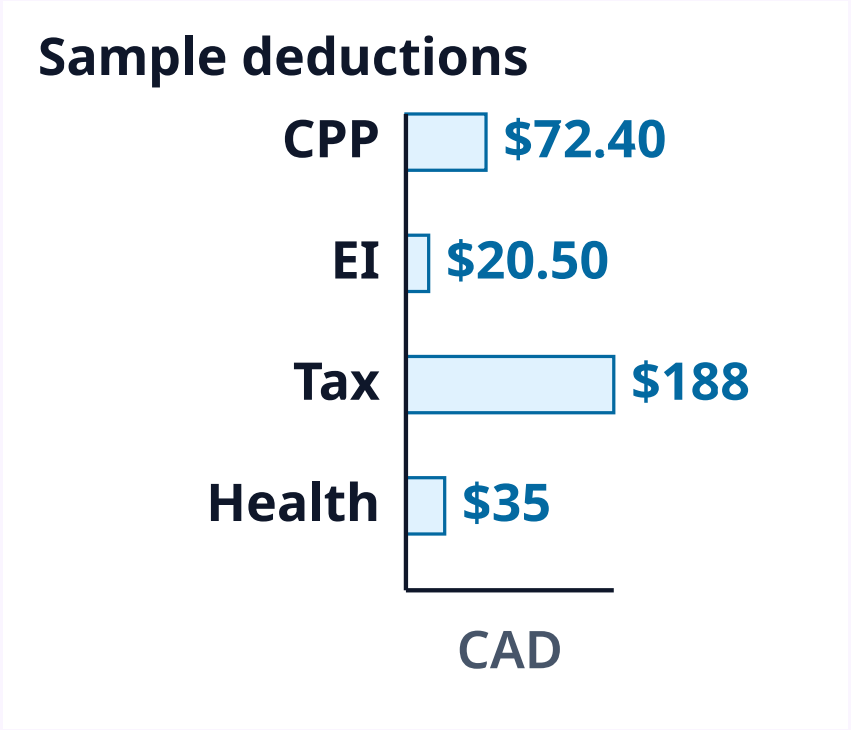
## Income tax subtracted a second time

- The corrected net pay is 934.10 after the 188 dollars tax has already been subtracted once.
- Subtracting that 188 dollars again produces 934.10 minus 188.
- That second subtraction double-counts the tax, and the corrected net stays 934.10.



## Other lines a stub can list

- Uniforms, union dues, charitable donations, and a payroll tax can appear as further given deductions.
- Each of those lines is another subtraction when the question lists it.
- Gross pay still counts the pay before the lines, and net pay still counts what remains after the lines the question includes.



# Stub check

- Find the net pay for gross 1250 dollars with the four given deductions 72.40 dollars, 20.50 dollars, 188, dollars and 35 dollars.
- State the gross-pay rise from 40 hours at 18 dollars to 40 hours at 20 dollars.

