

Increasing a number by a percentage

100% of a number is the number itself.

50% of a number is half of the number.

150% of a number is the number plus half of it.

Eg, 150% of 20 is (100% of 20) + (50% of 20) = 20 + 10 = 30.

Eg, 110% of 20 is (100% of 20) + (10% of 20) = 20 + 2 = 22.

Without using a calculator, calculate:

Question	Working	Answer
150% of \$12	$12 + 6$	18
110% of \$200	$200 + 20$	220
105% of 80	$80 + 4$	84
101% of \$400	$400 + 4$	404
200% of \$400		800
102% of \$50	$50 + 0.5 \times 2$	51
108% of \$2000	10% of \$2000 8% is 160	2160
107% of \$4,000,000	1% is 40,000 7% is 2,800,000	4,280,000

Finally, you may use a calculator to complete this table:

110% of \$500	(a) 550
110% of the answer in (a)	(b) 605
110% of the answer in (b)	(c) 665.5
110% of the answer in (c)	(d) 732.05
110% of the answer in (d)	(e) 805.26

Check your answer in (e) by typing 500×1.1^5 into your calculator.

Calculating % of quantities using mental arithmetic

For the most part we use technology for calculations of interest. However, fluency with technology is rooted in number sense – knowing when to add, multiply, subtract or divide. Also, we often round awkward values to easy values to use mental arithmetic as a checking mechanism for complex calculations.

The easy percentages to calculate with mental arithmetic are:

1%	Divide by 100
10%	Divide by 10
50%	Divide by 2

These are building blocks to other percentages such as:

25%	Half of 50%
5%	Half of 10%
15%	10% plus 5%
12%	10% plus 1% plus 1%
75%	50% plus 25%

And so on...

Again, without using a calculator, calculate the following:

15% of \$80	10% is 8 then 5% is 4 so 15% is 12	\$12
11% of \$80	$8 + 0,8$	\$8,80
12% of \$60	$6 + 1,2$	\$7,20
75% of \$300	$150 + 75$	\$225
90% of \$300	$300 - 30$	\$270
9% of \$200	$20 - 0,2$	\$19,80
1% of \$200,000	\$2000	\$2000
21% of 84,000	$2 \times 8400 + 8400 + 840$	\$17640

A house is on the market for \$440,000.

Property sales tax is 1% on the first \$200,000; 2% on the portion greater than \$200,000. How much does the buyer need to pay as tax when they buy this house?

$$\begin{array}{r}
 200\,000 + 240\,000 = 440\,000 \\
 \begin{array}{l} 1\% \quad 2\% \\ 2000 + 4800 = \$6800 \end{array}
 \end{array}$$

Grade 11 Finance

Unit 1 is about calculating interest. We begin with some numeracy with percentages.

Benchmarks: 25%; 50%; 75%

Use mental arithmetic only to complete the table:

	25%	50%	75%	100%
\$12	43	86	9	12
\$200	50	100	150	200.
\$80	20	40	60	80
\$5	1.25	2.50	3.75	5
\$3000	750	1500	2250 2250	3000
\$60	15	30	45	60
\$32	8	16	24	32

Again, using mental arithmetic only, put the following fractions (consider them test grades) into the correct box in the table below:

Fractions:

$\frac{3}{60}$, $\frac{73}{80}$, $\frac{23}{32}$, $\frac{7}{8}$, $\frac{4}{12}$, $\frac{44}{200}$, $\frac{11}{12}$, $\frac{5}{16}$, $\frac{19}{32}$, $\frac{3}{5}$, $\frac{37}{80}$, $\frac{3}{16}$,
 , $\frac{16}{16}$, $\frac{24}{24}$

Less than 25%	Between 25% and 50%	Between 50% and 75%	Between 75% and 100%
$\frac{3}{16}$, $\frac{3}{60}$, $\frac{44}{200}$	$\frac{4}{12}$, $\frac{5}{16}$, $\frac{37}{80}$	$\frac{23}{32}$, $\frac{19}{32}$, $\frac{3}{5}$	$\frac{11}{12}$, $\frac{73}{80}$, $\frac{7}{8}$

Check your answers with a calculator. (Eg, type 3÷60 to turn it into a decimal)

What's Left?

Jen is 17.

Jen works part time at a Pizza restaurant.

Her usual hours are Fridays & Saturdays, 7.30pm to 2:30 am.

She gets a pay check every two weeks.

She has an older sibling (19) and one younger sibling (11), and all of them have birthdays in the summer.

She gets paid by the hour. The standard rate is \$12 per hour, however she gets time and a half after midnight*.

The whole family are keen rugby players. Jen used to play on a team, but now her part time work and her studies are taking up all her time.

Jen's favorite food used to be pizza, but now she gets to eat pizza so much she chooses sushi over pizza.

She has to pay EI (employment insurance). This is 1.66% of her income. This is deducted from her pay. $100 - 1.66 = 98.34$

Because she works more hours in the summer time, her income exceeds \$12000 per year, and so she gets tax deducted from her pay roll. The tax deduction on each pay check is \$23.

Every time Jen is paid, she puts 10% into a pension; and 10% into a savings account that she intends to use when she graduates from school to either buy a car or go on a trip somewhere like France or Australia. Really, she's keeping her options open.

Jen would like to go to college, maybe to study biology or maybe journalism. Once again, she's not sure so she's keeping her options open. For a while she thought she'd like to be a physiotherapist.

She has decided that the remainder of her paycheck she can use however she wants, however she knows that as soon as she turns 18 her parents are going to request a contribution towards her keep (food/utility bills etc) and she'll have to pay CPP (Canada Pension Plan).

From any one paycheck, how much does Jen have to spend?

(take your time, filter the information, work with others, compare answers, iron out disagreements etc...)

$$\begin{aligned}\text{Pay per shift} &= 4.5 \times 12 + 2.5 \times 18 = 99 \\ \text{pay per 2 weeks} &= 99 \times 2 = \$396 \\ \text{Deduct EI} &= 396 \times 0.9834 = \$389.4264 \\ \text{Deduct 23 tax} &= 389.4264 - 23 = \$366.4264 \\ \text{Deduct 20\% savings} &= 366.4264 \times 0.8 = \underline{\underline{\$293.14112}}\end{aligned}$$

She has \$293.14 to spend.

*time and a half - 1.5 times your normal pay rate.

7 hrs, 1×12
 $4\frac{1}{2}$ before midnight
 $2\frac{1}{2}$ after midnight
 $\times 18$