

## Goods and Services Tax (GST)

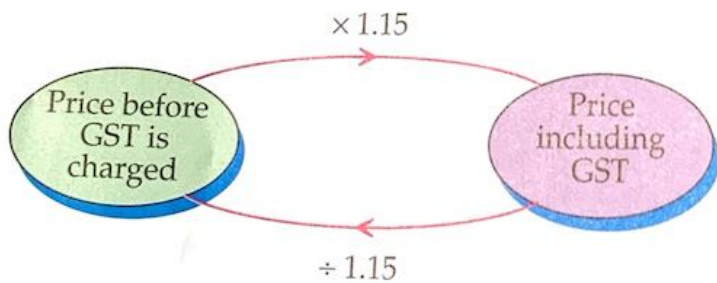
GST is a tax on spending. It is an example of an **indirect tax**, in contrast to income tax, which is called **direct taxation**. GST was imposed in 1985 at a rate of 10%, and then three years later the rate was increased to  $12\frac{1}{2}\%$ . In 2010 the Government raised the rate of GST to 15%.

GST is calculated by working out 15% of the value of a good or service, and then adding that on to the value. Usually the GST is included in the final price, which means it is not obvious to the non-mathematical just how much of the price is tax!

We saw in the earlier section on **Increasing and decreasing by percentages** (see page 35) that adding on 15% to a value is exactly the same as multiplying by 1.15.

$$\text{GST-included price} = (\text{price excluding GST}) \times 1.15$$

This diagram shows how to move from the GST-excluded price to the GST-included price, and vice-versa.



### Example

A computer is advertised as selling at \$1999 plus GST, which indicates that the price does not include GST.

- Calculate the GST-inclusive price.
- How much of this amount is GST?

### Answer

- $\text{GST-inclusive price} = \$1999 \times 1.15 = \$2298.85$
- $\text{GST} = (\text{GST-incl. price}) - (\text{GST-excl. price})$   
 $= \$2298.85 - \$1999 = \$299.85$



**Example**

A burger, fries and cola cost \$9.40 including GST. Calculate the price before GST is added, and the amount of GST charged.

**Answer**

$$\begin{aligned} \text{Price before GST} &= \frac{\text{price including GST}}{1.15} \\ &= \frac{\$9.40}{1.15} \\ &= \$8.17 \end{aligned}$$

$$\begin{aligned} \text{GST} &= (\text{GST-incl. price}) - (\text{GST-excl. price}) \\ &= \$9.40 - \$8.17 = \$1.23 \end{aligned}$$

**EXERCISE 3.09**

- These prices are GST exclusive. Calculate the GST-inclusive price for each one.
  - \$250
  - \$7.49
  - \$660
  - \$93.45
- These prices *include* GST. Calculate the price before GST was added to them.
  - \$70.20
  - \$6142.50
  - 63 cents
  - \$493.88
- Here is a list of sales (including GST) made by a hire firm. The accountant has to calculate the GST on each one, and then write a cheque for the GST and send it to the Inland Revenue Department.
  - chainsaw \$75.50
  - punch-bowl and party glasses \$102.40
  - tables, chairs and canvas marquee \$312.68
  - cobblestone splitter and compactor \$239.00

How much should the accountant make out the cheque for?
- This table shows prices of products sold by a computer accessories firm. Calculate the values marked **a–m**.

Product	Price excluding GST	GST amount	Price including GST
Colour laser printer	\$3799	\$569.85	<b>a</b>
DVD-R drive	\$299	<b>b</b>	<b>c</b>
26" LCD monitor	<b>d</b>	<b>e</b>	\$786.38
Wireless router	\$499	<b>f</b>	<b>g</b>
Ergonomic keyboard	<b>h</b>	<b>i</b>	\$156.38
Desktop publishing software	\$999	<b>j</b>	<b>k</b>
DVD/RW disks (box of 10)	<b>l</b>	\$2.38	<b>m</b>

5 In the United Kingdom there is a tax called VAT which works in a similar way to GST. But the rate of VAT is 17.5%, not 15% as it is in New Zealand. Imagine you are a student in London, and are given the task of completing this table (a-h) which shows prices at a London travel agency.

	Price excluding VAT	VAT	Price including VAT
Example	£100	£17.50	£117.50
Train tickets to Edinburgh	£68	a	b
Tour of Buckingham Palace	£19	c	d
Underground travel pass	e	f	£8.50
Phantom of the Opera tickets	g	h	£55.46

6 An electric drill costs \$135 (15% GST inclusive). If the rate of GST was increased from 15% to 20% how much would the drill cost?



**EXERCISE 3.10**

- Set up a spreadsheet to calculate both kinds of conversion:
  - GST-exclusive price → GST-inclusive price
  - GST-inclusive price → GST-exclusive price.

The extract below shows how you should display the results. The example is for \$16 plus GST = \$18.40 and \$45 less GST = \$39.13.

	A	B	C	D	E
1	<b>Price excl. GST</b>	<b>Price incl. GST</b>		<b>Price incl. GST</b>	<b>Price excl. GST</b>
2	\$16.00	\$18.40		\$45.00	\$39.13
3	\$19.00			\$630.00	
4	\$45.35			\$9.95	
5	\$102.67			\$1,099.00	
6	\$900.00			\$72.30	
7	\$1,020.60			\$5,007.35	
8	\$0.35			\$0.80	
9	\$348.80			\$110.00	

You are required to complete columns B and E. You should do this by entering a suitable formula in cells B2 and E2, and then copying downwards seven times.



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## Govt raises GST to 20%

The main feature in last night's Budget was a rise in the rate of GST from 15% to 20%. This move, which had been foreshadowed in speeches from senior government ministers, is expected to be widely opposed by the business community. They are not only concerned about the effect on retail sales, but also fear the cost of compliance. Every price on items ranging from clothing to meals on restaurant menus will have to be changed. Accountants and retail staff are now faced with millions of calculations in order to raise prices. A spokesperson for low-income families said

## Queen in brawl at Palace

Bert Head, the manager of struggling south London football club Crystal Palace, admitted last night that he has disciplined striker Gerry Queen for an off-the-ball incident in their match against Arsenal. The match, shown on nationwide television, was briefly interrupted when a spectator crossed the barrier

Because of your mathematical expertise you have been asked to help a firm change their prices from 15% GST inclusive to 20% GST inclusive. You will do this using a spreadsheet.

- The first column should show the current GST-inclusive price (at 15%).
- In column B enter a formula and copy to show prices excluding GST.
- In column C enter a formula to calculate GST at 20%. Copy the formula downwards.
- In column D display the increase in price that results from the rise in GST from 15% to 20%.

The first calculation, for a current price of \$832, has been done for you. Complete the spreadsheet.

	A	B	C	D
1	<b>Price at 15% GST</b>	<b>Price excl. GST</b>	<b>Price with 20% GST</b>	<b>Price increase</b>
2	\$832.00	\$723.48	\$868.17	\$36.17
3	\$34.00			
4	\$112.00			
5	\$99.95			
6	\$50.00			
7	\$6,000.00			
8	\$0.80			
9	\$6.70			