

Warm up

20. Hans jogs at an average speed of 8 km/h.

- a) How far will he jog in 45 min?
 b) How much faster will Hans need to jog in order to run the same distance in 40 min? Explain your reasoning.

$$\begin{aligned} \text{a) } \frac{x}{45} &= \frac{8}{60} \\ x &= \frac{8}{60} \times 45 \\ x &= 6 \text{ km} \end{aligned}$$

Distance
Time

$$\begin{aligned} \text{b) } &6 \text{ km in } 40 \text{ min} \\ &\frac{6}{40} \rightarrow \text{km/m} \\ &= 0.15 \text{ km/m} \\ &\Rightarrow \text{km/h } (\times 60) \\ &= 9 \text{ km/h} \\ &\text{Needs to run } 9 - 8 \\ &= 1 \text{ km/h faster} \end{aligned}$$

$$\frac{6}{\left(\frac{40}{60}\right)} = 6 \times \frac{60}{40}$$

Applying Percentages to Sales Taxes and Discounts

sales taxes

- money collected by the government on purchases
- usually written as a percent

Provincial Sales Tax (PST)

- sales tax collected by the provincial government
- rate varies by province

Goods and Services Tax (GST)

- tax on sales and services, collected by the federal government

discount

- amount subtracted from a listed price to give a sale price

Example 1: Calculate PST and GST

The bicycle that Dieter likes at Pop's Cycles costs \$249 plus ~~PST and GST~~ ^{HST}. How much will the bike cost, including taxes?

$$\begin{aligned} \text{HST} &= 13\% \\ &= 0.13 \end{aligned}$$

$$\text{Multiplier} = 1.13$$

$$\begin{aligned} \Rightarrow \$249 \times 1.13 \\ &= \$281.37 \end{aligned}$$

To create multiplier
add on the percentage
to 1

Example 2: Calculate a Discount and Taxes

The regular price of a DVD is \$28.99. Now, it is on sale at a 25% **discount**.

- a) Find the sale price.
b) At the store, ~~PST and GST~~ ^{HST} are calculated on the discount price. How much would you have to pay for the DVD, including taxes?



$$\begin{aligned} \text{Take away } 25\% \\ &= 0.25 \end{aligned}$$

$$\begin{aligned} \text{a) Multiplier} &= 1 - 0.25 \\ &= 0.75 \end{aligned}$$

$$\begin{aligned} \$28.99 \times 0.75 \\ &= \$21.75 \end{aligned}$$

$$\begin{aligned} \text{b) Add on } 13\% \\ \Rightarrow \$21.75 \times 1.13 \\ &= \$24.58 \end{aligned}$$

Recap to create the
MULTIPLIER

① Turn the percentage into
a decimal $[\div 100]$

② Add onto ONE or
Subtract from ONE

Discount ← → Adding

MULTIPLIER

Key Ideas

- Taxes are extra costs that retailers must collect on sales and send to the government.
- The two taxes added onto purchases in Ontario are the Provincial Sales Tax (PST) and the Goods and Services Tax (GST).
- A discount is an amount subtracted from the regular price of an item to give a sale price.
- To calculate the final price of an item, first subtract any discounts. Then, add the sales taxes that apply.

shirt	\$35.99
PST	\$2.88
GST	\$2.52
TOTAL	\$41.39

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