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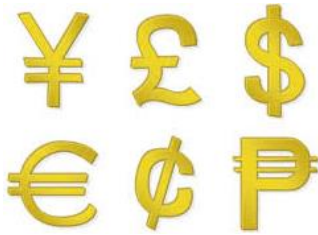
MA1
Consumer arithmetic

Goals

This week the work is on

- Mark-ups and discounts
- Profit and loss
- Inflation and GST
- Converting rates
- Currency exchange
- Best buys

Theoretical Components

Resources:
PDF file: Week 2 Notes and Exercises

The following site provides a comprehensive view of the concept of unit pricing
https://www.accc.gov.au/consumers/groceries/grocery-unit-prices

Knowledge Checklist
- Profit and loss
- Inflation as a measure of the change in the cost of living
- Goods and services tax (GST)
- Converting currency
- Using *unit pricing* as an aid when shopping

Order
1. Read through the notes and examples
2. Work through the exercises
3. Complete the investigation at the end of the booklet.
4. Check Mathspace for any quizzes to complete.
5. Complete the reflection at the end of the booklet
6. Come and see your teacher and make sure you are up to date.

Practical Components

Work through the exercises and show the completed tasks to your teacher.

Be sure to ask for help as you need for the successful completion of all tasks.

Remember to regularly check Google Classroom for messages.

Investigation

Complete the task at the end of the booklet and submit your work for checking. 😊

Other

Remember to check hawkermaths.com for each week's learning brief.

Make sure you have joined Google Classroom. If you have not, see your teacher.

A profit is made when goods are sold for more than the cost price.
- Profit = Selling price - Cost price

A loss is made when goods are sold for less than the cost price
- Loss = Cost price - Selling price

It is usual to use percentage profit or percentage loss to compare returns for different items.

When calculating the percentage profit or loss, cost price is used unless otherwise stated.

$$\text{Percentage profit} = \frac{\text{profit}}{\text{cost price}} \times 100\% \qquad\qquad \text{Percentage loss} = \frac{\text{loss}}{\text{cost price}} \times 100\%$$

Examples

1. Find the percentage profit on an item that was bought for $30 and later sold for $38.

Cost Price (CP), Selling Price (SP)

$$CP = \$30; \ SP = \$38$$

$$\text{Profit} = SP - CP$$

$$\text{Profit} = \$38 - \$30$$
$$= \$8$$

$$\text{Percentage profit} = \frac{\text{Profit}}{\text{CP}} \times 100\%$$

$$\text{Percentage profit} = \frac{8}{30} \times 100\%$$
$$= 26.67\%$$

2. Steffi runs a market jewelry stall. She spends $450 on supplies to make 36 necklaces. She works on a profit margin of 85%. How much should she sell each necklace for?

Cost per necklace = 450 ÷ 36 = $12.50

A profit of 85% means increase cost price by 85% ie 185% of cost price

185% of $12.50 = $\frac{185}{100}$ × 12.5 = 23.125 which we round to $23.13 so

Steffi would probably sell each necklace for $23 or perhaps $24.

1. A local tradesman works on a profit margin of 140%. Calculate the selling price for:

      a) a dining set that cost him $2350 to make

      b) a rocking horse that cost him $120 to build

2. Find the percentage profit (to 2 decimal places) for each of the following items.

Item	CP ($)	SP ($)
Tracksuit	80	139.95
T-shirt	16	22.50

3. The following goods were sold at a garage sale. Find the percentage loss for each of the items, correct to 2 decimal places.

Item	CP ($)	SP ($)
Cutlery	40	8
Two bedside lamps	100	22

4. A shopkeeper buys 20 kg of cooking chocolate for $50 and sells it in 500 g packets at $3 each. Find the profit made and express it as a percentage of the cost price.

5. By selling a collection of coins for $177, Igor makes a profit of 18%. What was the original cost of the collection?

6. Discounted tyres are reduced in price by 35%, they now sell for $69 each. Determine the original price of one tyre and the saving if you buy one tyre.

Inflation is an increase in the price of goods and services. Over time, inflation reduces the purchasing power of a dollar, thereby lowering its value. For example, if the price of petrol rises, drivers must pay more to fill their tanks and they have less money available for other spending (e.g., eating out and buying clothing). The annual inflation rate in Australia is usually around 3%.

Example

Amity receives a pay rise from $53,000 to $54,800. If the annual inflation rate is 7.3% has her salary kept up with inflation?

Pay increase = 54800 - 53000 = $1800

Percentage increase = $\frac{1800}{53000}$ × 100 = 3.396…% = 3.4%

Her salary has not 'kept up' with inflation.

GST is short for goods and services tax. That is exactly what it is, a tax on goods and services. It is described as a broad-based consumption tax as it applies to all sorts of goods and services that are consumed by the general public.

➢ GST is levied at a rate of 10%, which means that in order to calculate the GST to be <u>added</u> to goods or services you simply add 10% to the original price.
➢ To calculate the GST included in the price, divide the price by 11.

Eg. If you have goods to sell worth $100, then 10% of $100 is $10 so the goods will be sold for $110.
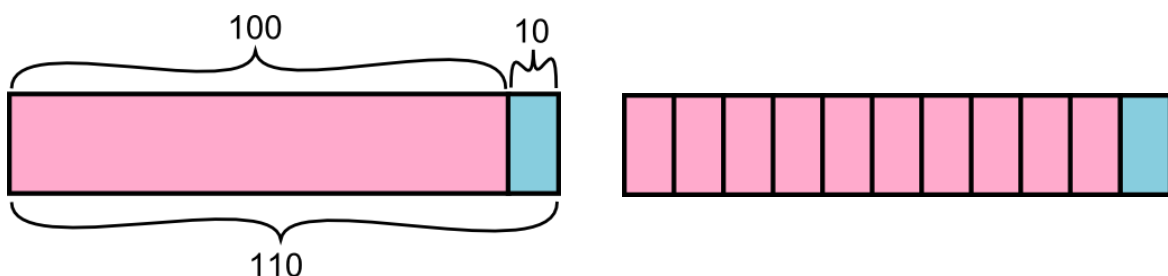
In reverse, $110 divided by 11 is $10 thus the GST is $10.

Australian businesses must obtain an Australian Business Number (ABN) from the Australian Taxation Office before they begin trading. Most businesses must also add a Goods and Services Tax (GST) to their prices. Some items, such as basic food and some medical supplies, are exempt from GST. Businesses must pay the GST they have collected to the Federal Government when they lodge their Business Activity Statement (BAS), usually quarterly.

1. A store increases their prices to stay in line with the rate of inflation. If the rate of inflation is 3.8%, calculate the new price of a television now priced at $850.

2. Calculate the percentage increase in the following prices.

    a) $48 to $56   b) $45 000 to $48 500

3. How much GST should be added to each of these prices?

    a) $55 pair of jeans   b) $90 pair of shoes

    c) $16 rose plant   d) $12 book

4. Each of the following prices is GST-inclusive. Calculate the amount of GST included in each price. Express your answers in dollars, correct to 2 decimal places.

    a) $9.50 hot BBQ chicken   b) $4.85 pack of toilet paper

    c) $11.25 bottle of shampoo   d) $5.80 pack of salted peanuts

5. Shaun buys T-shirts from a wholesaler for $7.50. To calculate the selling price he works on a profit margin of 150% and then adds GST. Calculate the final selling price.

6. A store increases the price of milk to stay in line with inflation. The inflation rates are 2.5% p.a, 3.2% p.a and 3.3% p.a. for three years respectively. If the price of milk started at $1.70 per litre, calculate the price of milk after the three years.

7. At the Great Gals end of year sale customers get a 10% discount on all goods. Will the discounted price be less than or the same as the original price before GST was added?

CURRENCY CONVERSIONS

Even though you may be planning to use a credit card when you are overseas, you will need access to local currency to pay bills such as bus and taxi fares and to buy small items of food. If you have an ATM card that has a blue 'cirrus' icon on the back, you can use the card in overseas teller machines to obtain local currency. When you obtain money in this way, the receipt, including the current balance in the account, will be in the currency of the country where you withdrew the money.

Even though you can obtain cash electronically, you still need to know how much you are paying, in Australian dollars, for overseas purchases.

The value of money changes all the time. The amount of money that can be exchanged for 1 AUD (one Australian dollar or $A1) is the exchange rate. Each day, exchange rates are published in newspapers, on television and on the Internet.

The easiest way to determine currency conversions is to use an online converter. However, if you're planning to buy items in local markets overseas, you are unlikely to be able to use the Internet and will need another way to calculate currency exchange.

The examples below are using the following exchange rates.

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1 AUD = 9.98 South African Rand (ZAR)

= 0.613 Euros (EUR)

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Examples

1. Convert $500 Australian Dollars into Euros.

    To change Australian Dollars into another currency, *multiply* by the $A1 exchange rate.

    $A1 = 0.613 euros

    $A500 = 0.613 × 500 euros

    = 306.5 euros

2. Convert 2890 South African Rand into Australian Dollars.

    To change another currency into Australian Dollars, *divide* by the $A1 exchange rate.

    9.98 rand = $A1

    2890 rand = $A (2890 /9.98)

    = $A289.58

Use the following exchange rates to answer questions 1 and 2 below.

1 AUD = 0.95 Canadian Dollar (CAD)

= 12.20 South African Rand (ZAR)

= 0.65 Euros (EUR)

(exchange rates current at 25/01/2023)

1. Convert $3000 Australian dollars into:

a) Canadian dollars

b) South African rand

c) euros.

2. Express the following amounts in Australian dollars.

a) $560 Canadian dollars

b) 1000 euros

c) 2000 rand

3. Suppose that the conversion rate between Australian dollars and Thai baht is $A1 = 28.56 baht. Convert $250 Australian dollars into baht.

4. When Anika was shopping in a Thai market, she wanted to buy some local handicrafts priced at 65 baht. How much is this in Australian dollars?

5. Anika worked out a quick way to convert a price in baht to a price in Australian dollars in her head. Her method is to disregard the last two digits and multiply the remainder by 3·5. For example, to change 213 baht into dollars, forget the 13 and just multiply the 2 by 3·5 to get approximately $A7.

Use Anika's method to determine an approximate Australian dollar equivalent to 406 baht. How accurate is Anika's method for this approximation?

It is a good idea to compare prices when shopping if you want to get as much value for your money as possible. It is easier to compare prices for items that are identical in quantity than those that come in varying quantities. For example, how would you know which was better value for money – a 150 g chocolate bar for $2.50 or a 375 g block for $6.20? One way to determine which item is better value for money is to calculate *unit prices* for the item. We will work in cost per 100 g or cost per 100 mL for this section.

Use these unit pricing tips to help get better value for money:

1. Compare the unit price of different sizes of the same brand's product, as well as products from different brands of the same product. The labels on the shelf that show the price of an item also show the unit price of that item.

2. Look out for special offers which might temporarily have the lowest unit price – but not always.

3. The unit price of large packs is often lower than small or medium size packs. But avoid buying a bigger pack if it's likely to go to waste.

4. If a product is available loose or pre-packaged, check the unit price of both.

5. Compare unit prices in different parts of the supermarket. The same product may be sold in different sections, for example, cheese, meats, seafood, nuts, fruit and vegetables.

Examples

   1. A 220 g item sells for $5.95. Calculate the unit price for a 100 g quantity.

   Divide the cost of the item by the quantity. $\frac{\$5.95}{220} = \$0.027 \ per \ g$

   Multiply by 100 to get the cost per 100 g. 0.027×100

   Write the answer as $ per 100 g. $= \$2.70 \ per \ 100 \ g$

   2. A 300 mL item sells for $2.50. Calculate the unit price for 100 mL capacity.

   Divide the cost of the item by the capacity. $\frac{\$2.50}{330mL} = \$0.008 \ per \ mL$

   Multiply by 100 to get the cost. 0.008×100

   Write the answer as $ per 100 mL. $= \$0.83 \ per \ 100 \ mL$

3. Which is better value for money – a 350 mL carton of milk for $1.75 or a 1.5 L bottle of milk for $4.50.

Calculate the unit price for 100 mL for each item. Remember to change litres into millilitres first.

1.5 L × 1000 = 1500 mL

$$\frac{\$1.75}{350\ mL} = 0.005 \qquad\qquad \frac{\$4.50}{1500\ mL} = 0.003$$

Compare the unit price per 100 mL.

$$0.005 \times 100 = \$0.50\ per\ 100\ mL \qquad\qquad 0.03 \times 100 = \$.30\ per\ mL$$

State which is better value.

$0.30 per 100 mL is cheaper than $0.50 per 100 mL, so the 1.5 L bottle of milk is better value for money.

EXERCISE 4

For these questions remember to change kilograms into grams and litres into millilitres.

1 kg = 1000 g   1 L = 1000 mL

1. Compare each bottle of soft drink to work out which item is better value for money per 100 mL.

a) 2 L for $2.99

b) 1.5 L for $2.50

c) 1.25 L for $2.00

d) 600 mL for $2.80

2. Calculate the unit price per 100 g for the following items. Explain which is better value.

		Which is better value?
180 g tin of Milo for $4.60	220 g tin of Milo for $5.50	
110 g of toothpaste for $2.65	175 g of toothpaste for $2.65	
500 g packet of spaghetti for $0.89	1 kg packet of spaghetti for $1.70	
2 kg bag of potatoes for $3.98	800 g bag of potatoes for $1.65	

Question 1

Before the beginning of a winter sale, a shop assistant was asked to reduce the prices of all items in the store by 12.5%. She calculated the new prices and attached new tags to the goods. At the end of the sale she was asked to put the old prices back. Unfortunately, the shop assistant had thrown the old tags away as she did not think she would need them again. She decided to add 12.5% to the sale prices. If the shop assistant proceeds in this manner, will she get back to the original prices? Explain your answer using Maths!

Question 2

If GST is 10% added to the price of an item, why do we divide the price we pay for the item by 11 to calculate the GST included?

CRITERIA	EXPECTATIONS	POSS	MULT	GIVEN	TOTAL
Practical	Student completes practical work (including exercises and Mathspace task) of the brief to an acceptable standard set by the teacher.	2	3		/6
Investigation	Student completes the investigation task of the brief to an acceptable standard set by the teacher.	2	2		/4
Communication and Reasoning	Student responses are accurate and appropriate in presentation of mathematical ideas in different contexts, with clear and logical working out shown.	4	-		/4
Knowledge and Application	Student submitted work selects and applies appropriate mathematical modelling and problem solving techniques to solve practical problems, and demonstrates proficiency in the use of mathematical facts, techniques and formulae.	4	-		/4
	Submission Guidelines				
Timeliness	Student submits the practical work and investigation by the set deadline. See scoring guidelines for specific details.	2	-		/2
		FINAL			/20

Student Reflection:

How did you go with this week's work?

What was interesting?

What did you find easy?

What do you need to work on?