

Goals



Unit goals

- Understand the concepts and techniques introduced in consumer arithmetic, algebra and matrices, and shape and measurement.
- Apply reasoning skills and solve practical problems.

This week the work is on

- Comparing two quantities
- Percentage increase and decrease
- Unitary method

Theoretical Components

Resources:

PDF file: Week 2 Notes & Exercises

On-line resources: linked in the notes and in Mathspace

Knowledge Checklist

- Expressing one quantity as a percentage of another
- Increasing or decreasing a quantity by a given percentage
- Finding the whole amount if a percentage of this whole amount is known.

Order

1. Look at the Investigation.
2. Work through the booklet and Mathspace lessons to develop the skills necessary to complete the Investigation
3. Complete the Investigation.
4. Show your completed booklet to Toby/Jacqueline and submit the Investigation for marking.

Practical Components

There are questions to be answered in the booklet *Week 2 Notes and Exercises*.

For this week the *Mathspace* lessons are:

Curriculum: General Maths 11 (AU)

Topic: Rates and Percentages

Subtopics:

- Percentage Change
- Unitary Method

Investigation

On HawkerMaths.com and attached to this week's booklet.

Quiz

Skills quiz on Mathspace

Week 2
Term 1
2021

Learning Brief
Mathematical Applications
Year 11 Semester 1 - MAP1T



COMPARING TWO QUANTITIES

One quantity may be expressed as a percentage of another quantity or number (both quantities must be in the same units).

To find the percentage something is of a whole, take $\frac{\text{what you want}}{\text{the total there is}} \times 100$.

EXAMPLE

What percent is 482 of 1780 $\frac{\text{what you want}}{\text{the total there is}} \times 100$

$$\frac{482}{1780} \times 100 = 27.08\%$$


QUESTION 1

1. What percentage of 65 is 13?
2. If 12 out of 21 students in a class are girls, then, to the nearest percent, what percent of the class is composed of girls?
3. In a laboratory test on 360 light globes, 16 globes were found to be defective. What percentage were satisfactory (to one decimal place)?
4. After three rounds of a basketball competition, a basketball team had scored 300 points and had 360 points scored against them. Express the points scored by the team as a percentage of the points scored against them.

5. In a population of 3.25 million people, 2115000 are under the age of 50 (including the people who is 50 years old). Calculate the percentage, to two decimal places, of the population who are **OVER** the age of 50.

PERCENTAGE INCREASE AND DECREASE

When increasing or decreasing a quantity by a given percentage, the percentage increase or decrease is always calculated as a percentage of the original amount.

Example: Sally's daily wage of \$175 is increased by 15%. Calculate her new daily wage.

$$\begin{aligned} 15\% \text{ of } 175 &= \frac{15}{100} \times 175 \\ &= 26.25 \end{aligned}$$

$$\begin{aligned} \text{Sally's new salary} &= 175 + 26.26 \\ &= \$201.25 \end{aligned}$$

Another method:

$$100\% + 15\% = 115\%$$

$$\begin{aligned} 115\% \text{ of } \$175 &= \frac{115}{100} \times 175 \\ &= \$201.25 \end{aligned}$$



QUESTION 2

1. Increase \$700 by 25%

2. Decrease 340 km by 18%

3. A restaurant adds a 12% surcharge to bills on public holidays. Calculate the total to be paid if the bill for a dinner for two on Australia Day comes to \$74.50

4. A large workshop normally services an average of 240 cars in a week. Due to an outbreak of the flu there is a 35% reduction in the number of cars serviced in a particular week. How many cars were serviced in that week?

5. Due to the closure of a large business in the area, a school is expecting an 11% drop in its student numbers for the next year. If the current enrolment is 684 students, what is the anticipated enrolment for the next year?

FINDING THE WHOLE FROM A GIVEN PERCENTAGE

If a percentage of an amount is known, then the whole amount can be found by using the **unitary method**. This involves dividing to find 1% then multiplying by 100 to find 100%

Example: If 15% of an unknown number is \$9, find the whole amount

$$\begin{aligned} 1\% \text{ is } 9 \text{ divided by } 15 &= \$0.6 \text{ (or 60 cents)} \\ \text{The whole (100\%)} &= 0.6 \times 100 \\ &= \$60 \text{ ie } \$9 \text{ is } 15\% \text{ of } \$60 \end{aligned}$$

Example: A TV discounted by 20% now sells for \$2100. What was the original price?

A 20% discount means that that \$2100 is 80% of the original price. The original price is 100% and 20% off leaves 80%.

$$\begin{aligned} 1\% \text{ is } 2100 \text{ divided by } 80 &= 26.25 \\ \text{The whole (100\%)} &= 26.25 \times 100 = \$2625 \end{aligned}$$



QUESTION 3

1. Find the whole amount if 75% is 150 km.

2. 245 students at a school voted for a new uniform. If this is 35% of the school population, what is the school population?

3. The cost of a holiday is discounted by 25%. The holiday now costs \$4800. What was the original cost of the holiday?

4. The profit on an iPod is 65% of the cost price. If the profit is \$106, find the cost price correct to the nearest dollar

Investigation Week 2

Question 1:

Thomas told me that there was to be a big clearance sale of books, and they were 50% off the already 50% off prices. I said – are you serious? They are giving them away for free? Are the books free? Support your answer using mathematics.

Question 2:

When doing moderate exercise, a relatively fit person should have a heart rate between 120-170 (for under 20 years old). This is between 60% and 85% of the maximum heart rate.

What is the maximum heart rate for this age group? The setting out is the critical part of this Investigation.

SCORING NOTES

Formatting **if necessary** for all typed/written assessments should be as follows:

Google Doc	11-12 Pt	1.15-1.5 Line Spacing	1 Space between paragraphs	Spelling and Grammar "Soft Limit"	In-Text Citations with footnotes	Title Page/Slide: <ul style="list-style-type: none"> Name Date Class Aim Assessment title
Slides	10-12 pt font text 14-24 pt font titles	1.0 1.15 Line Spacing	Bullet Points Preferred	Word Count per slide >100-110 "Soft Limit"	Approved Templates and Themes	
If there is a Timeliness Criterion - Student will receive full marks for a submission on time, half marks for a submission within one week of the deadline and no marks for a submission after this without prior arrangement with the teacher. Deadline exceptions can be discussed with your teacher for special considerations.						

"Soft Limits" are not rigidly defined limits and will be assessed on a case-by-case basis. Ask for clarification for specific tasks.

Possible Scoring Groups are out of 2 or 4 Points.

2-Point Criteria

	0 Points	1 Point	2 Points
2 Point Criteria	Not present or able to be assessed as the required criteria	Item is presented and does not meet expectations for quality, rigour, or detail	Item is presented and does meet expectations for quality, rigour, or detail

4-Point Criteria

	0 Points	1 Point	2 Points	4 Points
4 Point Criteria	Not present or able to be assessed as the required criteria	Item is presented, but does not meet expectations for quality, rigour, or detail	Item is presented and does meet expectations for quality, rigour, or detail	Item is presented and does meet expectations for quality, rigour, or detail. Response presented is consistently accurate and demonstrates very high level of proficiency.

Multiplier

Criteria will be combined with a **Multiplier**. While each criterion will be scored on the 0-1-2-4 scale, the multiplier will attach relevant worth to each criterion. Be aware of these multipliers and dedicate appropriate time to ensure you achieve your best result.

Achievement Standards:

Achievement standards can be found on the BSSS course description.

MARKING RUBRIC

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 Task	Student completes the investigation task of the week 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 exercises, Mathspace task 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?

Mathspace task title:
Mathspace score: