

Erindale College

Assessment Period:	2021 S2
Course:	ESSENTIAL MATHEMATICS
Unit:	Unit 2: Essential Mathematics (1.0)
Accreditation:	A
Year:	11

Unit Goals

- understand the concepts and techniques used in representing and comparing data, percentages, rates and ratios, and time and motion
- apply reasoning skills and solve practical problems in representing and comparing data, percentages, rates and ratios, and time and motion
- communicate their arguments and strategies when solving mathematical and statistical problems using appropriate mathematical or statistical language
- interpret mathematical and statistical information and ascertain the reasonableness of their solutions to problems

Content Description

Topic 1: Representing and comparing data

- identify examples of categorical data
- identify examples of numerical data
- display categorical data in tables and column graphs
- display numerical data as frequency distributions, dot plots, stem and leaf plots, and histograms
- recognise and identify outliers
- compare the suitability of different methods of data presentation in real-world contexts
- identify the mode
- calculate measures of central tendency, the arithmetic mean and the median
- investigate the suitability of measures of central tendency in various real-world contexts
- investigate the effect of outliers on the mean and the median
- calculate and interpret quartiles, deciles and percentiles
- use informal ways of describing spread, such as spread out/dispersed, tightly packed, clusters, gaps, more/less dense regions, outliers
- calculate and interpret statistical measures of spread, such as the range, interquartile range and standard deviation
- investigate real-world examples from the media illustrating inappropriate uses, or misuses, of measures of central tendency and spread
- compare back-to-back stem plots for different data-sets
- complete a five number summary for different datasets
- construct box plots using a five number summary
- compare the characteristics of the shape of histograms using symmetry, skewness and bimodality

Topic 2: Percentages

- review calculating a percentage of a given amount

- review one amount expressed as a percentage of another
- determine the overall change in a quantity following repeated percentage changes; for example, an increase of 10% followed by a decrease of 10%
- calculate simple interest for different rates and periods

Topic 3: Rates and ratios

- demonstrate an understanding of the elementary ideas and notation of ratio
- understand the relationship between fractions and ratio
- express a ratio in simplest form
- find the ratio of two quantities
- divide a quantity in a given ratio
- use ratio to describe simple scales
- review identifying common usage of rates such as km/h
- convert between units for rates; for example, km/h to m/s, mL/min to L/h
- complete calculations with rates, including solving problems involving direct proportion in terms of rate.
- use rates to make comparisons
- use rates to determine costs; for example, calculating the cost of a tradesman using rates per hour, call-out fees

Topic 4: Time and motion

- use units of time, conversions between units, fractional, digital and decimal representations
- represent time using 12-hour and 24-hour clocks
- calculate time intervals, such as time between, time ahead, time behind
- interpret timetables, such as bus, train and ferry timetables
- use several timetables and electronic technologies to plan the most time-efficient routes
- interpret complex timetables, such as tide charts, sunrise charts and moon phases
- compare the time taken to travel a specific distance with various modes of transport
- use scales to find distances, such as on maps; for example, road maps, street maps, bushwalking maps, online maps and cadastral maps
- optimise distances through trial-and-error and systematic methods; for example, shortest path, routes to visit all towns, and routes to use all roads
- identify the appropriate units for different activities, such as walking, running, swimming and flying
- calculate speed, distance or time using the formula $\text{speed} = \text{distance}/\text{time}$
- calculate the time or costs for a journey from distances estimated from maps
- interpret distance-versus-time graphs
- calculate and interpret average speed; for example, a 4-hour trip covering 250 km

Assessment Tasks

Name	Due Date	Weighting
Assignment 1	9 August - 13 August	25%
Exam 1	3 September - 8 September	25%
Assignment 2	25 October - 29 October	25%
Exam 2	17 November - 19 November	25%

School Assessment Information

For penalties for late and non-submission of work

See [BSSS Policy and Procedure Manual 4.3.10](#) for further information.

For academic integrity

See [BSSS Policy and Procedure Manual 4.3.12](#) for further information.

For appeals processes

See [BSSS Policy and Procedure Manual 7.2](#) for further information.

For moderation procedures (internal and external)

See [BSSS Policy and Procedure Manual 5](#) for further information.

Achievement Standards for ESSENTIAL MATHEMATICS A - Year 11

	<i>A student who achieves an A grade typically</i>	<i>A student who achieves a B grade typically</i>	<i>A student who achieves a C grade typically</i>	<i>A student who achieves a D grade typically</i>	<i>A student who achieves an E grade typically</i>
Reasoning and Communications	<ul style="list-style-type: none"> represents some complex mathematical concepts in numerical and graphical form in routine and non-routine problems for a variety of contexts communicates mathematical information in oral, written and/or multimodal forms, which are well reasoned, using accurate and appropriate language reflects with insight on own thinking and learning, evaluates planning, time management, use of appropriate strategies to work independently and collaboratively evaluates the potential of Mathematics to generate knowledge in the public good 	<ul style="list-style-type: none"> represents mathematical concepts in numerical and graphical form in routine and non-routine problems for a variety of contexts communicates mathematical information in oral, written and/or multimodal forms, which are clear, using accurate and appropriate language reflects on own thinking and learning, analyses inter and intrapersonal skills including planning, time management, use of appropriate strategies to work independently and collaboratively analyses the potential of Mathematics to generate knowledge in the public good 	<ul style="list-style-type: none"> represents mathematical concepts in numerical and graphical form to some routine and non-routine problems for routine contexts communicates mathematical judgements in oral, written and/or multimodal forms, using appropriate language reflects on own thinking and learning, explains planning, time management, use of appropriate strategies to work independently and collaboratively explains the potential of Mathematics to generate knowledge in the public good 	<ul style="list-style-type: none"> represents simple mathematical concepts in numerical or graphical form in routine problems for routine contexts communicates simple mathematical judgements in oral, written and/or multimodal forms, with some use of appropriate language reflects on their own thinking with some reference to planning, time management, use of appropriate strategies to work independently and collaboratively describes the potential of Mathematics to generate knowledge in the public good 	<ul style="list-style-type: none"> represents simple mathematical concepts in numerical or graphical form in routine problems for structured contexts communicates simple mathematical information in oral, written and/or multimodal forms, with limited use of appropriate language reflects on their own thinking with little or no reference to planning, time management, use of appropriate strategies to work independently and collaboratively identifies some ways in which Mathematics is used to generate knowledge in the public good
Concepts and Techniques	<ul style="list-style-type: none"> applies mathematical concepts in a variety of complex contexts to routine and non-routine problems select and applies mathematical techniques to solve routine and non-routine problems in a variety of complex contexts uses digital technologies effectively to solve routine and non-routine problems in a variety of contexts 	<ul style="list-style-type: none"> applies mathematical concepts in a variety of contexts to routine and non-routine problems applies mathematical techniques to solve routine and non-routine problems in a variety of contexts uses digital technologies appropriately to solve routine and non-routine problems in a variety of contexts 	<ul style="list-style-type: none"> applies mathematical concepts in some contexts to routine and non-routine problems applies simple mathematical techniques to solve routine problems in some contexts uses digital technologies appropriately to solve routine problems in some contexts 	<ul style="list-style-type: none"> applies simple mathematical concepts in limited contexts to routine problems applies simple mathematical techniques to solve routine problems in limited contexts uses digital technologies to solve routine problems in structured contexts 	<ul style="list-style-type: none"> applies simple mathematical concepts in structured contexts applies simple mathematical techniques to solve routine problems in structured contexts uses digital technologies to solve routine problems in structured contexts