

# Erindale College

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

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