Southern Ontario Collegiate
Math Placement Test

Name: _____

Date: _____

Score: _____

SAMPLE

2018/2019

Prepared by Dr. Firas Mohammed

Southern Ontario Collegiate's math placement test enables us to place each student in the most suitable course for their current level of knowledge and expertise to support further learning.
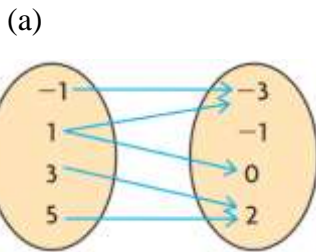
It covers the following topics.

## Topic 1: Characteristics of Functions

This topic includes: Relation and function (domain and range), line and its equation, inverse of line. Transformation of such functions like quadratics and square roots. Factoring of quadratics polynomials, add and subtract any polynomials, state restrictions of rational functions (polynomial over polynomial), add subtract multiply and divide rational functions.

Samples:

1) State domain and range of following and which one is a function or just a relation:
   (a)   (b)
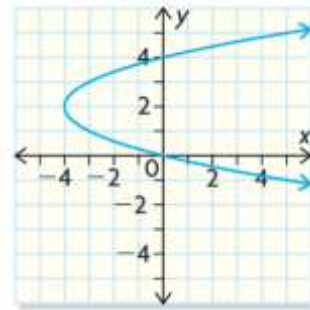
2) The inverse of the line $y = 3 - 2x$ is $y = \dfrac{3-x}{2}$

3) Factor the following:
   (a) $30x^2 - 9x - 3 = (15x+3)(2x-1)$
   (b) $16 - 25x^2 = (4-5x)(4+5x)$

4) Simplify and state restrictions of: $\dfrac{2x-8}{x^2-x-12} = \dfrac{2}{x+3}$ and restrictions are: $x \neq 4, x \neq -3$

Topic 2: Polynomials & Exponential Functions

All about quadratics functions, for example: how to find vertex, find maximum or minimum value of quadratic functions, find roots of quadratics, power rules for algebraic expressions.

Samples:

1) For quadratic function: $y = -5x^2 + 20x + 4$ vertex form is: $y = -5(x-2)^2 + 24$ and its vertex is (2,24) and line of symmetry is x=2 it has maximum value y=24.

2) Simplify radicals and write your answer in exact way (keep your answer in radicals);
   $(3-\sqrt{6})(2+\sqrt{24}) = -6+4\sqrt{6}$

3) Simplify. And express the answer in positive exponent;

$$\sqrt[3]{\frac{\left(10x^3\right)^2}{\left(10x^6\right)^{-1}}} = 10x^4$$

Topic 3: Trigonometry

This topic includes all about ratios of sin, cos, tan, sec, csc, and cot of special angles and any angle, sin law, cos law and its application in word problems, transformation of sinusoidal functions, like what is period from given graph, amplitude.

Samples:

1) For triangle ΔXYZ side x=2.2 cm and side y=3.2 cm side z=4.3 cm, find angle $\angle X$. You can use cosine law for angles to find $\angle X$.

2) For transformation from given graph:
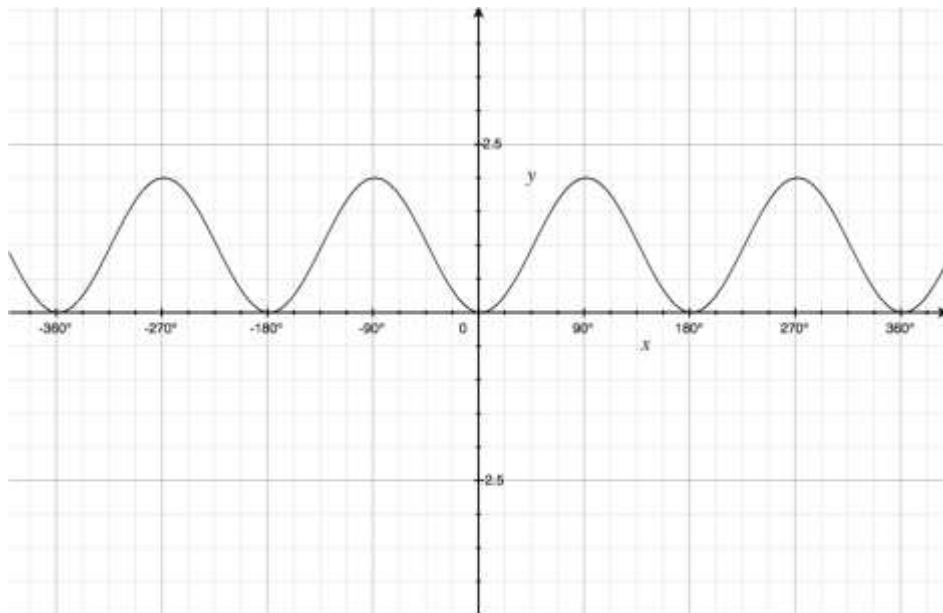
Amplitude $= 1$, new priod$=180°$, phase shift$= 45°$

Topic 4: Discrete Functions

This topic includes two parts, first: arithmetic and geometric sequences and series, expansion of binomials by using Pascal's triangle. The second part is about financing, like simple interest and compound interest, with compound periods like compounded annually, semi-annually, quarterly, monthly.

Samples:

1) Find the sum of following two series:
   5+8+11+…+2135 this series is arthmetic with common difference d=3 last term with n=711, and sum is 760770

   -6+24-96+…+98304 This series is geometric with common ratio r= -4; find an easy way to solve this by using formula: $S_n = \dfrac{t_{n+1} - t_1}{r-1}$, so that the answer is 78642.

2) Mario borrows $4800 for 8.5 years at a fixed rate of simple interest. At the end of that time he owes $8000. What interest rate is being charged?

(Hint: earning interest I= A-P where A is total amount and P is principal, I=rPt)

3) On her15th birthday, Trudy invests $10000 at 8%/a compounded monthly. When Lina turns 45 she invests $10000 at 8%/a compounded monthly. If both women leave their investments until they are 65, how much more will Trudy's investment be worth?

(Hint: use formula $A = P(1+i)^n$, where A is future amount P is principal $10000, $i = \dfrac{r}{m}$ and $n = m \times t$, m is compounded period in this case is 12 t is number of years r rate of interest in decimals).
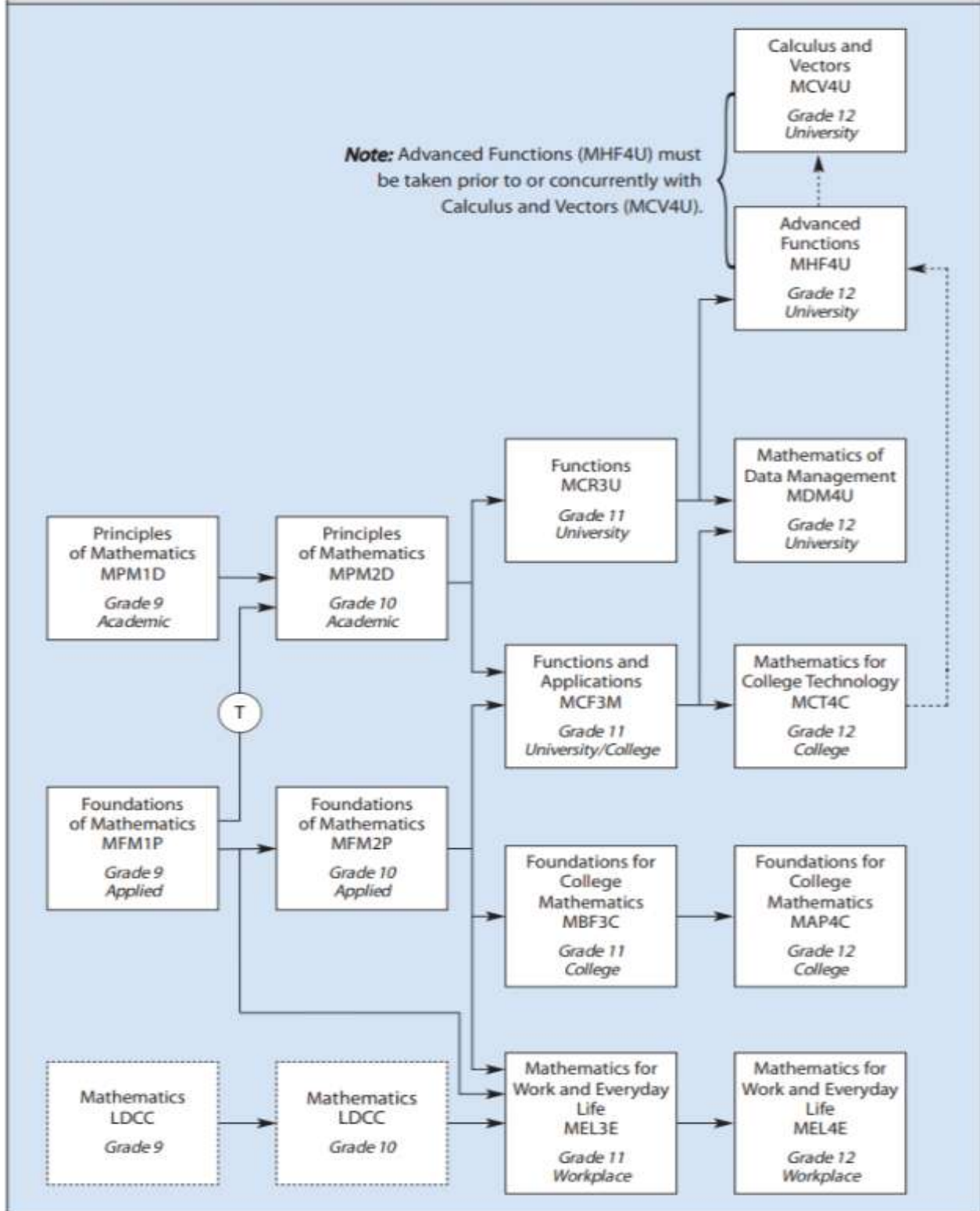
Good Luck preparing for the placement test.

Dr. Firas Mohammed

Ontario Ministry of Education – Mathematics Requirements and Prerequisites

Prerequisite Chart for Mathematics, Grades 9–12

This chart maps out all the courses in the discipline and shows the links between courses and the possible prerequisites for them. It does not attempt to depict all possible movements from course to course.

Note: Advanced Functions (MHF4U) must be taken prior to or concurrently with Calculus and Vectors (MCV4U).

Calculus and Vectors MCV4U
Grade 12 University

Advanced Functions MHF4U
Grade 12 University

Principles of Mathematics MPM1D
Grade 9 Academic

Principles of Mathematics MPM2D
Grade 10 Academic

Functions MCR3U
Grade 11 University

Mathematics of Data Management MDM4U
Grade 12 University

Functions and Applications MCF3M
Grade 11 University/College

Mathematics for College Technology MCT4C
Grade 12 College

T

Foundations of Mathematics MFM1P
Grade 9 Applied

Foundations of Mathematics MFM2P
Grade 10 Applied

Foundations for College Mathematics MBF3C
Grade 11 College

Foundations for College Mathematics MAP4C
Grade 12 College

Mathematics LDCC
Grade 9

Mathematics LDCC
Grade 10

Mathematics for Work and Everyday Life MEL3E
Grade 11 Workplace

Mathematics for Work and Everyday Life MEL4E
Grade 12 Workplace

Notes:
- T – transfer course
- LDCC – locally developed compulsory credit course (LDCC courses are not outlined in this document.)