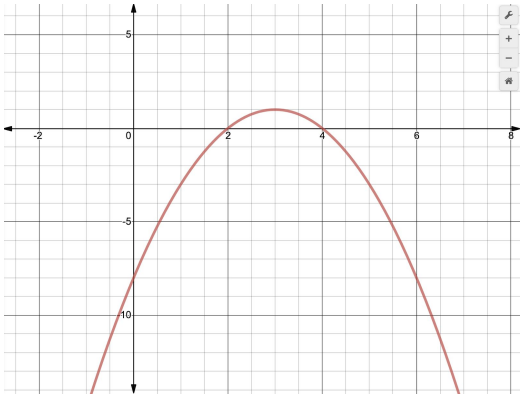
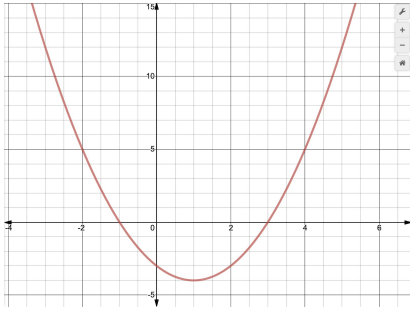
Self-Assessment for Grade 11 University/College Math (MCF3M)

Students who are registered for Grade 11 University/College Math, Functions and Applications (MCF3M) may benefit from a self evaluation and review of the following sample of expectations from Grade10 Academic Math (MPM2D) and Grade 10 Applied Math (MFM2P).

The questions in this self-assessment reflect some of the key ideas learned in prerequisite courses. They do not represent the problem solving approach or the rich experience that students would be exposed to in a classroom. The intention is for students to revisit some key concepts and, if needed, access review materials in an informal environment at a pace that is comfortable for the student.

Concept	Sample Question and Answer	How comfortable do you feel with this concept?	Link for further support
I can solve linear systems by graphing or by using the methods of substitution or elimination	1. Solve the system of equations. $4x - 5y = 12$ $6x - 10y = 24$ 2. Some high school students held a bake sale recently to raise money for a field trip. They charged $7 for fruit pies and $10 for meat pies. They sold a total of 52 pies and earned $424. How many of each type of pie did they sell?	 ☐ **Very comfortable**  ☐ **Somewhat comfortable**  ☐ **Not at all comfortable**	Solve Linear Systems
I can evaluate an algebraic expression involving exponents, by substituting a value into the variable	3. If $x = \frac{3}{5}$ and $y = 3$, find: a. x^3 b. $-y^4$	 ☐ **Very comfortable**  ☐ **Somewhat comfortable**  ☐ **Not at all comfortable**	Working with Exponents

I can identify the key features of a graph of a parabola and use the appropriate terminology to describe them	4. For the following graph, state the key features - direction of the opening; coordinates of the vertex; equation of the axis of symmetry; x and y-intercepts.  	☐ **Very comfortable** ☐ **Somewhat comfortable** ☐ **Not at all comfortable**	Key Features of a Parabola
I can factor polynomial expressions involving common factors, trinomials, and differences of squares	5. Factor the following: a) $x^2 - 14x + 49$ b) $x^2 - 16$ c) $7x^3 - 14x^2 - 14x$	☐ **Very comfortable** ☐ **Somewhat comfortable** ☐ **Not at all comfortable**	Factoring Difference of Squares and Perfect Squares
I can determine whether a relation is linear, quadratic or neither by looking at a table of values	6. Determine whether the graph associated with the following tables of values is linear, quadratic or neither. a. x | y_1 0 | −8 1 | −3 2 | 0 3 | 1 4 | 0	☐ **Very comfortable** ☐ **Somewhat comfortable** ☐ **Not at all comfortable**	Comparing Linear and Quadratic Relations

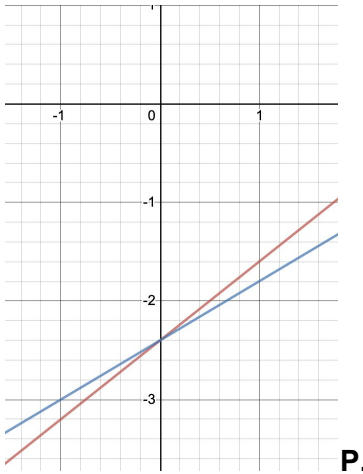
	b. x | y_1 0 | −2 1 | −1 2 | 0 3 | 1 4 | 2 c. x | y_1 −2 | −8 −1 | −1 0 | 0 1 | 1 2 | 8		
I can determine and describe the connection between the factors of a quadratic expression and the x-intercepts of the graph using $y = (x - r)(x - s)$ **.**	7. Determine the equation of the graph below. 	 ☐ **Very comfortable**  ☐ **Somewhat comfortable**  ☐ **Not at all comfortable**	Finding an Equation from a Graph
I can determine the zeros (x-intercepts) of the graph of a quadratic relation	8. Determine the zeros of the graph of $y = x^2 - 10x + 24$	 ☐ **Very comfortable**  ☐ **Somewhat comfortable**  ☐ **Not at all comfortable**	Revisiting Factored Form

I can determine the measures of the sides and angles in right triangles using the primary trigonometric ratios	9. Determine the measures of side AB and angle A, if the length of side AC is 5 and side CB is 12.  	 ☐ **Very comfortable**  ☐ **Somewhat comfortable**  ☐ **Not at all comfortable**	Sine and Cosine Sine and Cosine Ratios Tangent Applications of the Tangent Ratio Pythagorean Theorem The Pythagorean Theorem
I can solve problems involving the measures of sides and angles in right triangles in real-life applications.	10. A surveyor is 40m from the edge of a building. The angle of elevation from the surveyor to the top of the building is $55°$. What is the height of the building?	 ☐ **Very comfortable**  ☐ **Somewhat comfortable**  ☐ **Not at all comfortable**	Applications of Sine and Cosine Applications of Sine and Cosine Applications of Tangent Applications of the Tangent Ratio

Solutions to Sample Questions:

1. Solve the system of equations.

$$4x - 5y = 12$$
$$6x - 10y = 24$$



P.O.I at (0, -2.4)

2. Some students at NHS held a bake sale recently to raise money for a field trip. They charged $7 for fruit pies and $10 for meat pies. They sold a total of 52 pies and earned $424. How many of each type of pie did they sell?

Let F represent the number of Fruit Pies sold.
Let M represent the number of Meat Pies sold.

$7F + 10M = 424$ **(1)**

$F + M = 52$ **(2)**

Solve (2) for F: $F = 52 - M$

Sub this into (1)

$7(52 - M) + 10M = 424$

$364 - 7M + 10M = 424$

$3M = 60$

$M = 20$

Sub $M = 20$ **into (2):** $F + 20 = 52 \rightarrow F = 32$

Therefore they sold 32 Fruit pies and 20 Meat pies

3. If $x=\frac{3}{5}$ and $y=3$, find:

a. $x^3=\left(\frac{3}{5}\right)^3=\frac{27}{125}$

b. $-y^4=-(3)^4=-(81)=-81$

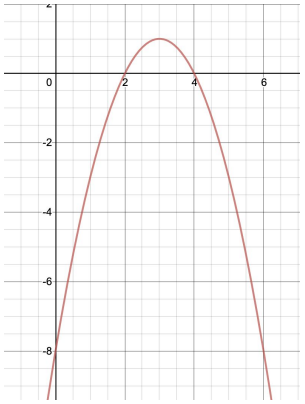
4. For the following graph, state the key features -

a. direction of the opening; **Down**

b. coordinates of the vertex; **(3,1)**

c. equation of the axis of symmetry; **x = 3**

d. x and y-intercepts. **y-int: (2, 0),(4, 0) y-int: (0, -8)**



5. Factor the following:

a. $x^2-14x+49$ **Add: -14 Mult: 49 two values that fit this process are:-7, -7** $x^2-14x+49=(x-7)(x-7)=(x-7)^2$

b. x^2-16 **Difference of 2 squares:** $(x-4)(x+4)$

c. $7x^3-14x^2-14x$ **GCF first:** $7x(x^2-2x-2)$ **Remaining trinomial is unfactorable (but need to check…)**

6. Determine whether the graph associated with the following tables of values is linear, quadratic or neither.

a.

x	y_1
0	-8
1	-3
2	0
3	1
4	0

Quadratic

b.

x	y_1
0	-2
1	-1
2	0
3	1
4	2

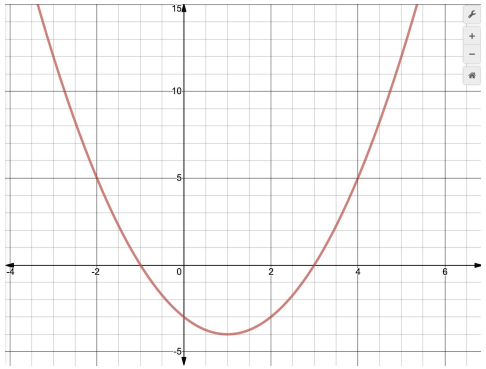
Linear

c.

x	y_1
-2	-8
-1	-1
0	0
1	1
2	8

neither linear nor quadratic

7. Determine the equation of the graph below.



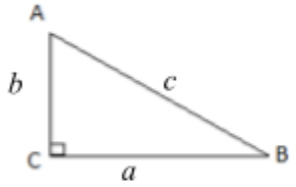
$y = (x - 1)^2 - 4$

8. Determine the zeros and the max/min value of $y = x^2 - 10x + 24$

For zeros: Factor $(x-6)(x-4) \rightarrow x = 6$ **or** $x = 4$

For max/min value: since it opens up → it is a minimum value
It occurs on the axis of symmetry: $x = 5$.
Min value will occur at $x = 5$. $y = 5^2 - 10(5) + 24 = 25 - 50 + 24 = -49$

9. Determine the measures of side AB and angle A, if the length of AC is 5 and CB is 12.



$$Tan\ A = \frac{12}{5} \rightarrow A = Tan^{-1}\frac{12}{5} = 67.4°$$

$AB^2 = 5^2 + 12^2 = 25 + 144 = 169$
$AB = 13$

Or

$$\sin 67.4 = \frac{12}{AB} \rightarrow AB = \frac{12}{\sin 67.4} \rightarrow AB = 13$$

10. A surveyor is 40m from the edge of a building. The angle of elevation from the surveyor to the top of the building is $55°$. What is the height of the building?

$$Tan\ 55 = \frac{height}{40}$$

$$Height = 40\ Tan\ 55 = 57.13$$