KNOW

- Can recognize and identify the content of the course accurately.
- Can answer "What is", "Where are" and "Which is" type questions.

Emerging *I do not know the content.*		Developing *I am getting to know the content.*				Proficient *I know most of the content.*				Mastery *I know the content.*			
Cannot identify any content independently and would respond "I don't know" when asked "What is this section about?"		Can identify the basics of the content. Knows the foundational material but does not yet know the material that builds on it.				Knows all the foundational material and some/most of the later content that builds on it. Does not know the final/advanced content.				Could open the textbook or notebook and give an overview of the content with confidence and minimal error.			
I	C-	C-				C				C+/B-			
<1	1	1.25	1.5	1.75	2	2.25	2.5	2.75	3	3.25	3.5	3.75	4
40	50	52	54	56	58	60	62	64	66	68	70	73	75

DO

• Can use the basic course content in a meaningful way.
• Demonstrated through the curricular competency skills: reasoning, solving, and communicating.

	Emerging *I am learning to do things with the content. I am not able to solve problems clearly or with justification.*	Developing *I can do some things with the content independently, but I am learning to use it in different ways.*	Proficient *I can do a lot with the content, but I am not yet fluent with strategies or able to justify all my decisions.*	Mastery *I can use the content to solve problems in different ways, communicate my solutions clearly, and am able to justify my decisions.*
Reasoning	Estimations are not reasonable or justified. Cannot use technology to demonstrate minor relationships/characteristics . Cannot estimate a reasonable solution and guess and check is a blind shot in the dark.	Estimations are not reasonable but there is a somewhat reasonable justification. Can explore mathematical ideas with technology but cannot demonstrate key relationships/characteristics. Can use guess and check or brute force to attack problems paired with estimation to narrow in on a solution.	Estimations are reasonable but not justified. Can test mathematical ideas and draw valid conclusions with technology but cannot show all relationships/characteristics. Can use different strategies as an exhaustive list but without a specific purpose or strategies are very rigid.	Estimations are reasonable and are well justified. Can analyze and test mathematical ideas and relationships of functions to draw valid conclusions with technology. Can use efficient and flexible strategies and logic that have a specific purpose for a problem.
Solving	Can solve introductory problems with technology and a reference aid. Cannot use drawings or diagrams to solve a problem or will use drawings or diagrams not related to the problem.	Can solve introductory questions with technology independently. Can use a basic drawing or diagram to support a problem, but key characteristics are not shown and will have significant errors.	Can solve most questions with technology. Can use drawing and diagrams that are mostly accurate to solve a problem but are not used to make the solution stronger.	Can consistently solve questions accurately with technology. Can use accurate simulations, drawings, and diagrams to solve a problem and make the argument stronger.
Communicating	Cannot represent ideas in pictorial and symbolic forms, or there is significant error associated with it that it becomes unclear. Uses incorrect math vocabulary and notation or does not yet know how to use it properly.	Can either represent ideas using graphs OR symbolic forms but not both. Shows the beginning usage of math vocab and notation. Notable errors with logic, although the main idea can be understood.	Graphs and equations are mostly accurate but will have a notable exception to them that makes them fall short of mastery. Shows a good use of math vocabulary and notation. Work has minor errors with logic.	Graphs and equations are consistently accurate and well labelled so to be easily read. Shows a strong and appropriate use of math vocabulary and notation. The work flows with logic and direction.

I/C-/C				C/C+			B-			B		B+/A-	
<1	1	1.25	1.5	1.75	2	2.25	2.5	2.75	3	3.25	3.5	3.75	4
<73 (use KNOW Proficiency level to help)						75	76	78	80	81	83	86	88

UNDERSTAND

- Can connect mathematical concepts to each other and to other disciplines, reflect on mathematical thinking, and use mathematical arguments to support personal choices.

	Emerging *I do not understand the content to model or explain why something happens.*	Developing *I can model and explain some problems and ideas.*	Proficient *I can model and explain many problems and ideas and have a good understanding of the relationships between functions.*	Mastery *I can model and explain most/all problems and ideas and have a very complete understanding of functions.*
Characteristics of Functions	Model is not related to the behaviour OR uses the model provided by someone else. Predictions made by the model are inaccurate or not related to the problem. Cannot independently identify key characteristics of a function from its equation.	Model has a major error so that the equation does not capture the true behaviour. Predictions made by the model are incomplete or has major errors. Can identify the characteristics of a function based on its equation or from a description given in context.	Can model similar problems, but the model will have subtle errors. Predictions made by the model are accurate but not reasonable or not presented in a way that is easily understood due to minor errors with the model. Can describe the characteristics a class of functions will have based on its equation or a description given in context but cannot relate the two together to explain why.	Can accurately model a problem in context. Predictions made by the model are accurate and reasonable and presented in a way that is easily understood. Can explain why a given class of functions will have a particular characteristic based on its equation and from a description given in context
Inverses	Cannot manipulate functions in an algebraic manner without consistent logical errors. Cannot describe the inverse in relation to a function.	Can manipulate functions in an algebraic manner with few errors in key steps. Can justify some behaviour of the inverse, but will have some error in key points.	Can manipulate functions in an algebraic manner with few errors to solve problems. Can justify most of the behaviour of the inverse relationship, but will miss a few horizontal/vertical swaps	Can fluently manipulate functions in an algebraic manner with no logical errors to solve problems. Can fluently justify the behaviour of the inverse relationship.
Transformations	Cannot explain transformations in concrete, pictorial, or symbolic forms. Cannot predict or justify the behaviour of inverses and other function characteristics under a transformation. Cannot explain or justify how some transformations are related or not related to each other.	Can explain and some standard transformations in concrete, pictorial, and symbolic forms. Can start to predict and justify the behaviour of inverses and other function characteristics under a transformation. Can explain and justify how some transformations are related or not related to each other.	Can accurately represent and explain most standard transformations in concrete, pictorial, and symbolic forms. Can predict and justify the behaviour of inverses and other function characteristics under a transformation with error being caused from reversing order or switching a horizontal to vertical. Can explain and justify how most transformations are related or not related to each other.	Can accurately represent and explain any transformation in concrete, pictorial, and symbolic forms. Can consistently predict and justify the behaviour of inverses and other function characteristics under a transformation. Can explain and justify how certain transformations are related or not related to each other.

C		B				A-			A			A+	
<1	1	1.25	1.5	1.75	2	2.25	2.5	2.75	3	3.25	3.5	3.75	4
<86 (use DO proficiency level to help)						88	90	92	93	95	96	98	100