

Standard Institutionally Developed College: N/A

EDGE Compatible: No

Pre-requisites

Co-requisites

Course Description

Prepares students for calculus. The topics discussed include an intensive study of polynomial, rational, exponential, logarithmic, and trigonometric functions and their graphs. Applications include simple maximum and minimum problems, exponential growth and decay.

Course Length

	Minutes	Contact Unit
Lecture:	2250	
Lab 2:	0	
Lab 3:	0	
Practicum/Internship:	0	
Clinical:	0	
Total:	2250	3

Semester Credit Hours: 3

Competencies

Order	Description	Lecture	Lab2	Lab3	Practicum/Internship	Clinical	Total Minutes	Semester Credit Hrs
1	Define basic concepts related to functions and their graphs	125	0	0	0	0	125	
2	Graph a function using a graphing calculator	25	0	0	0	0	25	
3	Define and graph linear functions and solve applications involving them	50	0	0	0	0	50	
4	Define and graph quadratic functions and solve applications involving them	50	0	0	0	0	50	
5	Perform operations involving functions including finding the inverse of a function	75	0	0	0	0	75	

Order	Description	Lecture	Lab2	Lab3	Practicum/ Internship	Clinical	Total Minutes	Semester Credit Hrs
6	Define and graph polynomial functions including end behavior and zeros (real and imaginary)	150	0	0	0	0	150	
7	Define and graph rational functions including basic characteristics and transformations	150	0	0	0	0	150	
8	Define, evaluate, and graph exponential functions and use them to model phenomena	150	0	0	0	0	150	
9	Define a logarithm and use logarithmic properties	100	0	0	0	0	100	
10	Define and graph a logarithmic function; find domain and range; and solve applications	125	0	0	0	0	125	
11	Define, determine domain and range, and graph the six circular functions	200	0	0	0	0	200	
12	Define the six trigonometric functions; use to solve right/oblique triangles and solve applications	250	0	0	0	0	250	
13	Use trigonometric identities to prove other identities and work with the inverse trig. functions	350	0	0	0	0	350	
14	Define and work with vectors	200	0	0	0	0	200	
15	Define and work with complex numbers	250	0	0	0	0	250	
16		0	0	0	0	0	0	
	Totals for Course MATH 1113 - Precalculus (version 201003):	2250	0	0	0	0	2250	3

Learning Outcomes

Define basic concepts related to functions and their graphs

Order	Description	Learning Domain	Level of Learning
1	Define Function	Cognitive	Knowledge
2	Define domain and range of function	Cognitive	Knowledge
3	Define maximum and minimum values of a function	Cognitive	Knowledge
4	Define increasing, decreasing, and constant functions	Cognitive	Knowledge
5	Define end behavior of a function	Cognitive	Knowledge

Order	Description	Learning Domain	Level of Learning
6	Define zeros and roots of a function	Cognitive	Knowledge
7	Define transformation of a function	Cognitive	Knowledge

Graph a function using a graphing calculator

Order	Description	Learning Domain	Level of Learning
1	Draw the graph of a function using a graphing calculator	Cognitive	Knowledge

Define and graph linear functions and solve applications involving them

Order	Description	Learning Domain	Level of Learning
1	Define a linear function	Cognitive	Knowledge
2	Draw the graph of a linear function	Cognitive	Knowledge
3	Solve applications that involve linear functions	Cognitive	Application

Define and graph quadratic functions and solve applications involving them

Order	Description	Learning Domain	Level of Learning
1	Define a quadratic function	Cognitive	Knowledge
2	Draw the graph of a quadratic function	Cognitive	Knowledge
3	Determine the vertex and the maximum or minimum value of a quadratic function	Cognitive	Application
4	Solve applications involving quadratic functions	Cognitive	Application

Perform operations involving functions including finding the inverse of a function

Order	Description	Learning Domain	Level of Learning
1	Determine the sum of two functions	Cognitive	Application
2	Determine the difference of two functions	Cognitive	Application
3	Determine the product of two functions	Cognitive	Application
4	Determine the quotient of two functions	Cognitive	Application
5	Determine the composition of two functions	Cognitive	Application
6	Compute a the value of a composition of two functions given a domain value	Cognitive	Application
7	Determine the inverse of a function	Cognitive	Application

Define and graph polynomial functions including end behavior and zeros (real and imaginary)

Order	Description	Learning Domain	Level of Learning
1	Define polynomial functions	Cognitive	Knowledge
2	Draw the graph of a polynomial function	Cognitive	Application
3	Determine the end behavior of a polynomial function using the leading term test	Cognitive	Application
4	Determine all the real and imaginary zeros of a polynomial function	Cognitive	Application
5	Draw the graph of transformations of polynomial functions	Cognitive	Application

Define and graph rational functions including basic characteristics and transformations

Order	Description	Learning Domain	Level of Learning
1	Define a rational function	Cognitive	Knowledge
2	Determine the domain and range of a rational function	Cognitive	Application
3	Determine the vertical and horizontal asymptotes of a rational function	Cognitive	Application
4	Draw the graph of a rational function	Cognitive	Application
5	Draw the graph of a transformation of a rational function	Cognitive	Application

Define, evaluate, and graph exponential functions and use them to model phenomena

Order	Description	Learning Domain	Level of Learning
1	Define an exponential function	Cognitive	Knowledge
2	Calculate the value of an exponential function	Cognitive	Application
3	Determine the domain and range of an exponential function	Cognitive	Application
4	Draw the graph of an exponential function	Cognitive	Application
5	Draw the graph of transformations of exponential functions	Cognitive	Application
6	Use exponential functions to model natural phenomena such as exponential growth and decay and practical situations such as compound interest	Cognitive	Application

Define a logarithm and use logarithmic properties

Order	Description	Learning Domain	Level of Learning
1	Define a logarithm	Cognitive	Knowledge
2	Use logarithmic properties to determine values of logarithmic expressions	Cognitive	Application
3	Solve logarithmic and exponential equations using properties of logarithms	Cognitive	Application

Define and graph a logarithmic function; find domain and range; and solve applications

Order	Description	Learning Domain	Level of Learning
1	Define a logarithmic function	Cognitive	Knowledge
2	Determine the domain and range of logarithmic functions	Cognitive	Application
3	Draw the graph of logarithmic functions	Cognitive	Application
4	Solve applications involving logarithmic functions	Cognitive	Application

Define, determine domain and range, and graph the six circular functions

Order	Description	Learning Domain	Level of Learning
1	Define the six circular functions	Cognitive	Knowledge
2	Describe the domain and range of the six circular functions	Cognitive	Knowledge
3	Draw the graph of circular functions using amplitude, period, and phase shift	Cognitive	Application

Define the six trigonometric functions; use to solve right/oblique triangles and solve applications

Order	Description	Learning Domain	Level of Learning
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Order	Description	Learning Domain	Level of Learning
1	Define six trigonometric functions	Cognitive	Knowledge
2	Solve right triangles using trigonometric functions	Cognitive	Application
3	Solve applications involving right triangles using the trigonometric functions	Cognitive	Application
4	Solve oblique triangles using the law of sines and law of cosines	Cognitive	Application

Use trigonometric identities to prove other identities and work with the inverse trig. functions

Order	Description	Learning Domain	Level of Learning
1	Use the fundamental trigonometric identities to prove other identities	Cognitive	Application
2	Use the sum and difference identities to prove other identities	Cognitive	Application
3	Use the double angle and half-angle identities to prove other identities	Cognitive	Application
4	Determine the domain and range of the trigonometric functions and their inverses	Cognitive	Application
5	Draw the graph of the trigonometric functions and their inverses	Cognitive	Application

Define and work with vectors

Order	Description	Learning Domain	Level of Learning
1	Define vectors	Cognitive	Knowledge
2	Find the components of a vector	Cognitive	Knowledge
3	Perform operations on vectors	Cognitive	Application
4	Solve application problems involving vectors	Cognitive	Application

Define and work with complex numbers

Order	Description	Learning Domain	Level of Learning
1	Define a complex number	Cognitive	Knowledge
2	Describe complex numbers in standard, rectangular, polar, and trigonometric forms	Cognitive	Knowledge
3	Draw the graph of a complex number on the Argand diagram	Cognitive	Application
4	Perform operations on complex numbers	Cognitive	Application
5	Use DeMoivre's Theorem to find powers and roots of complex numbers	Cognitive	Application

No Learning Outcomes entered for this Course Competency.

References

Order	Reference Type	Description
1	Book with Author(s) Listed	Blitzer. (?). Algebra and trigonometry, an early functions approach. (2nd). Boston, MA: Pearson.
2	Book with Author(s) Listed	Dugopolski. (2009). Precalculus: Functions and graphs. (3rd). Boston, MA: Pearson .

Order	Reference Type	Description
3	Book with Author(s) Listed	Larson, Hostetler, & Edwards. (2010). Precalculus functions and graphs: A graphing approach. (5th). Boston, MA: Cengage (Houghton Mifflin).
4	Book with Author(s) Listed	Waits, Foley, Demana & Kennedy. (2007). Precalculus: Graphical, numerical, algebraic. (7th). Boston, MA: Pearson .