

Curriculum Map: Calculus (non AP)

Course: CALCULUS Sub-topic: Calculus

Grade(s): 12

Course Description: This course comprises a review of graphing relations, set and numbers, a study of limits (finite and infinite), derivatives of algebraic functions, trigonometric functions and natural logs and their applications, integration of algebraic functions, trig functions, and natural logs, different methods of integration (substitution, partial fractions, integration by parts), definite integrals and their applications, polar coordinates and equations, and other selected topics are also stressed.

Unit: algebra skills review

Timeline: Week 1 to 3

Unit Description: a review of algebra and other skills necessary for future success in calculus

Unit Essential Questions: what skills do I need to review to succeed in calculus class?

Unit Big Ideas: domain / range
factoring / multiplying
equations of lines
piecewise graphs

Unit Materials: textbook
Nspire calculator
Smart Slate

Unit Assignments: various worksheets

Unit Key Terminology & Definitions : factoring / FOIL
slope, equation of line, y intercept
domain / range

This Curriculum Map Unit has no Topics to display

Unit: continuity

Timeline: Week 4

Unit Description: continuity of functions

Unit Essential Questions: how do I determine if a function is continuous?

Unit Big Ideas: continuity
Intermediate Value Theorem

Unit Materials: textbook

Nspire calculator

Smart Slate

Unit Assignments: various worksheets

Unit Key Terminology & continuous

Definitions : Intermediate Value Theorem

Topic: continuity

Minutes for Topic: 44

Topic: intermediate value theorem

Minutes for Topic: 44

Unit: limits

Timeline: Week 5

Unit Description: limits of functions

Unit Essential Questions: how do i find the limit of a function?

Unit Big Ideas: one sided limits

two sided limits

limits at infinity

Unit Materials: textbook

Nspire calculator

Smart Slate

Unit Assignments: worksheets

Unit Key Terminology & limit

Definitions : one sided limit

two sided limit

Topic: limit def

Minutes for Topic: 44

Topic: one and two sided limits

Minutes for Topic: 44

Topic: limits at infinity

Minutes for Topic: 44

Unit: rates of change and tangent lines

Timeline: Week 6

Unit Description: finding the slope of a curve using tangent lines

Unit Essential Questions: how do i find the slope of a curve?

Unit Big Ideas: finding the slope of a curve using tangent lines

Unit Materials: textbook
Nspire calculator
Smart Slate

Unit Assignments: textbook and various worksheets

Unit Key Terminology & Definitions : slope
tangent line
limit

Topic: slope of a curve using tangent line

Minutes for Topic: 44

Topic: normal lines

Minutes for Topic: 44

Unit: derivatives with definition

Timeline: Week 7

Unit Description: finding derivative using limit definition

Unit Essential Questions: how do i use limits to find the derivative of a function?

Unit Big Ideas: derivatives via limits

Unit Materials: textbook
Nspire calculator
Smart Slate

Unit Assignments: various worksheets and textbook

Unit Key Terminology & Definitions : derivative
slope
rate of change
limit

This Curriculum Map Unit has no Topics to display

Unit: differentiability

Timeline: Week 8

Unit Description: differentiability tests

Unit Essential Questions: what makes a function differentiable?
where does differentiability fail?

Unit Big Ideas: differentiability

Unit Materials: textbook
Nspire calculator
Smart Slate

Unit Assignments: textbook and various worksheets

Unit Key Terminology & Definitions : differentiability
continuity

This Curriculum Map Unit has no Topics to display

Unit: power rule derivatives

Timeline: Week 9

Unit Description: derivatives via the power rule

Unit Essential Questions: how do I calculate the derivative using power rule?

Unit Big Ideas: derivatives via the power rule

Unit Materials: textbook
Nspire calculator
Smart Slate

Unit Key Terminology & Definitions : power rule

Topic: power rule
Minutes for Topic: 44

Topic: negative and fractional exponents
Minutes for Topic: 44

Unit: product and quotient rules

Timeline: Week 10

Unit Description: using product and quotient rules

Unit Essential Questions: how do I calculate derivatives of products and quotients?

Unit Big Ideas: product and quotient rules for derivatives

Unit Materials: textbook

Nspire calculator

Smart Slate

Unit Assignments: various wkshts

Unit Key Terminology & Definitions : product rule

quotient rule

Topic: product rule

Minutes for Topic: 44

Topic: quotient rule

Minutes for Topic: 44

Unit: chain rule

Timeline: Week 11

Unit Description: derivatives via chain rule

Unit Essential Questions: how do i calculate derivatives using chain rule?

Unit Big Ideas: chain rule

Unit Materials: textbook

Nspire calculator

Smart Slate

Unit Assignments: various worksheets

Unit Key Terminology & Definitions : chain rule

Topic: chain rule, no trig

Minutes for Topic: 44

Topic: chain rule with product and quotient rules

Minutes for Topic: 44

Unit: trig derivatives

Timeline: Week 12

Unit Description: calculating derivatives of trig functions

Unit Essential Questions: how do I find the derivative of a trig function?

Unit Big Ideas: trig function derivatives

Unit Materials: textbook

Nspire calculator

Smart Slate

Unit
Assignments: worksheets and textbook

Unit Key Terminology & Definitions : sine, cosine, tangent, cotangent, secant, cosecant
derivative

Topic: trig derivatives
Minutes for Topic: 88

Topic: trig chains
Minutes for Topic: 44

Unit: implicit differentiation
Timeline: Week 13

Unit Description: calculating derivatives implicitly

Unit Essential Questions: how do I calculate derivatives implicitly?

Unit Big Ideas: calculating derivatives implicitly

Unit Materials: textbook
Nspire calculator
Smart Slate

Unit Assignments: various worksheets

Unit Key Terminology & Definitions : implicit differentiation

Topic: implicit differentiation
Minutes for Topic: 44

Topic: implicit with chain and trig
Minutes for Topic: 44

Unit: related rate applications
Timeline: Week 13 to 14

Unit Description: solving related rate problems

Unit Essential Questions: how do i solve problems with related rates using calculus?

Unit Big Ideas: related rate problems

Unit Materials: textbook
Nspire calculator
Smart Slate

Unit Assignments: various worksheets

Unit Key derivative
Terminology & Definitions : implicit
related rates

Topic: related rate word problems

Minutes for Topic: 88

Unit: extrema applications

Timeline: Week 15

Unit Description: solving applied extrema problems

Unit Essential Questions: how do i find the max/min of a problem using calculus?

Unit Big Ideas: solving applied extrema problems

Unit Materials: textbook
Nspire calculator
Smart Slate

Unit Assignments: various wkshts

Unit Key Terminology & Definitions : max / min
extrema

Topic: applied max min problems

Minutes for Topic: 44

Unit: curve sketching

Timeline: Week 16 to 17

Unit Description: applying the first and second derivative tests to assist in curve sketching of functions

Unit Essential Questions: how do i determine what a function looks like using the derivative?

Unit Big Ideas: first derivative test
second derivative test
concavity
increasing/decreasing
critical points
stationary points
inflection points

Unit Materials: textbook
Nspire calculator
Smart Slate

Unit Assignments: various worksheets

Unit Key Terminology & Definitions : first and second derivative tests

increasing / decreasing

critical and stationary points

inflection points

concavity

Topic: max/min/increasing/decreasing and critical points

Minutes for Topic: 88

Topic: inflection points and concavity, second derivative test

Minutes for Topic: 88

Unit: sigma notation

Timeline: Week 18

Unit Description: using sigma notation to calculate sums

Unit Essential Questions: how do i calculate large sums in a pattern using sigma notation?

Unit Big Ideas: using sigma notation

Unit Materials: textbook

Nspire calculator

Smart Slate

Unit Assignments: various worksheets

Unit Key Terminology & Definitions : sigma notation

Topic: sigma notation

Minutes for Topic: 44

Unit: integration introduction

Timeline: Week 20

Unit Description: development of integral concept using limit and area under a curve

Unit Essential Questions: how do i evaluate an indefinite and definite integral?

Unit Big Ideas: evaluating both definite and indefinite integrals

Unit Materials: textbook

Nspire calculator

Smart Slate

Unit Assignments: various worksheets

Unit Key Terminology & Definitions : integral
definite integral
indefinite integral

Topic: integration power rule

Minutes for Topic: 44

Topic: definite integration power rule

Minutes for Topic: 44

Unit: integration by substitution

Timeline: Week 21 to 22

Unit Description: using substitution to solve integrals

Unit Essential Questions: how do I integrate by substitution?

Unit Big Ideas: integration by substitution

Unit Materials: textbook
Nspire calculator
Smart Slate

Unit Assignments: various worksheets

Unit Key Terminology & Definitions : integration by u sub

Topic: u sub integrals

Minutes for Topic: 44

Topic: u sub integrals with solving

Minutes for Topic: 44

Unit: bounded area with integrals

Timeline: Week 24

Unit Description: using integrals to solve bounded area problems

Unit Essential Questions: how do I calculate the bounded area between two functions?

Unit Big Ideas: bounded area problems

Unit Materials: textbook
Nspire calculator
Smart Slate

Unit Assignments: various worksheets

Unit Key Terminology & Definitions : bounded area
integral

Topic: bounded area with integrals

Minutes for Topic: 44

Unit: bounded area using y axis switch

Timeline: Week 27

Unit Description: finding area by switching axis

Unit Essential Questions: what if the bounded area does not have a nice bound on the x axis?

Unit Big Ideas: y axis switch to find area

Unit Materials: textbook
Nspire calculator
Smart Slate

Unit Assignments: various worksheets

Unit Key Terminology & Definitions : y axis switch

Topic: y axis switch area problems

Minutes for Topic: 44

Unit: volume by washer method

Timeline: Week 25

Unit Description: finding volume by the washer method

Unit Essential Questions: how do I calculate the volume of a solid of revolution using calculus?

Unit Big Ideas: calculating volume using washer method

Unit Materials: textbook
Nspire calculator
Smart Slate

Unit Assignments: various worksheets

Unit Key Terminology & Definitions : integral
volume
washer method
solid of revolution
3D shape

Topic: volume by washer method

Minutes for Topic: 44

Topic:

Unit: exponential and logarithm review

Timeline: Week 30

Unit

Description: exponential and logarithm review

Unit Essential

Questions: how do i calculate a logarithm?

Unit Big Ideas: exponential and logarithm review

Unit Materials: textbook

Nspire calculator

Smart Slate

Unit

Assignments: various worksheets

Unit Key

logarithm

Terminology &

Definitions : e

base

change of base

Topic: log review

Minutes for Topic: 44

Unit: derivatives and integrals of e and logs

Timeline: Week 31

Unit

Description: calculating derivatives and integrals of exp and log functions

Unit Essential

Questions: how do i calculate the derivative of a log function?

how do i calculate the integral of a log function?

how do i calculate the derivative of an exponential function?

how do i calculate the integral of an exponential function?

Unit Big Ideas: derivatives and integrals of exp and log functions

Unit Materials: textbook

Nspire calculator

Smart Slate

Unit

Assignments: various worksheets

Unit Key

logarithm

Terminology &

Definitions : exponential

e

derivative

integral

This Curriculum Map Unit has no Topics to display

Unit: integration by parts

Timeline: Week 32

Unit Description: integration by parts

Unit Essential Questions: how do i use the parts technique to calculate certain integrals?

Unit Big Ideas: integration by parts

Unit Materials: textbook
Nspire calculator
Smart Slate

Unit Assignments: various worksheets

Unit Key Terminology & Definitions : integral
derivative
integration by parts

Topic: integration by parts

Minutes for Topic: 44

Unit:

This Curriculum Map Unit has no Topics to display