

Integrals

Instructional Focus	4 – Mastery	3 – Proficient	2 - Basic	1 – Below Basic	0 – No Evidence
Recognize antiderivatives of basic functions (FUN-6.C, FUN-6.D)	<p>Can Extend thinking beyond the standard, including tasks that may involve one of the following:</p> <ul style="list-style-type: none"> Designing Connecting Synthesizing Applying Justifying Critiquing Analyzing Creating Proving 	Integrate using ALL of the following techniques: <ul style="list-style-type: none"> Trig U-substitution Logarithmic Exponential Inverse Trig Power Rule Long division Completing the square <p>Follows math practices of algebraic computation, precision and reasoning*</p>	Integrate using SIX of the following techniques: <ul style="list-style-type: none"> Trig U-substitution Logarithmic Exponential Inverse Trig Power Rule Long division Completing the square 	Integrate using FOUR of the following techniques: <ul style="list-style-type: none"> Trig U-substitution Logarithmic Exponential Inverse Trig Power Rule Long division Completing the square 	<p>Little evidence of reasoning or application to solve the problem</p> <p>Does not meet the criteria in a level 1</p>
Approximate a definite integral (LIM-5.A, LIM-5.B, LIM-5.C)		Approximate a definite integral using all of the following techniques: <ul style="list-style-type: none"> Left hand sum Right hand sum Midpoint sum Trapezoidal sum Using multiple representations	Approximate a definite integral using ALL of the following techniques: <ul style="list-style-type: none"> Left hand sum Right hand sum Midpoint sum Trapezoidal sum Using multiple representations	Approximate a definite integral using THREE of the following techniques: <ul style="list-style-type: none"> Left hand sum Right hand sum Midpoint sum Trapezoidal sum Using multiple representations	
Calculate a definite integral using areas and properties (LIM-5.A, FUN-6.A)		<p style="text-align: center;">And</p> <p>Represent a definite as a limit case of the Riemann sum.</p> <p>Follows math practices of algebraic computation, precision and reasoning*</p>	Calculate a definite integral using BOTH of the following techniques: <ul style="list-style-type: none"> Properties of definite integrals Area under a curve using geometric formulas 	Calculate a definite integral using ONE of the following techniques: <ul style="list-style-type: none"> Properties of definite integrals Area under a curve using geometric formulas 	
Use the Fundamental Theorem of Calculus to analyze functions (FUN-5.A, FUN-6.B)		Do ALL of the following: <ul style="list-style-type: none"> Evaluate a definite integral using technology Evaluate a definite integral without technology Differentiate a function defined by an integral (a bound that is a function of x) Translate a definite integral into a limit of a related Riemann sum and vice versa <p>Follows math practices of algebraic computation, precision and reasoning*</p>	Do THREE of the following: <ul style="list-style-type: none"> Evaluate a definite integral using technology Evaluate a definite integral without technology Differentiate a function defined by an integral (a bound that is a function of x) Translate a definite integral into a limit of a related Riemann sum and vice versa 	Do TWO of the following: <ul style="list-style-type: none"> Evaluate a definite integral using technology Evaluate a definite integral without technology Differentiate a function defined by an integral (a bound that is a function of x) Translate a definite integral into a limit of a related Riemann sum and vice versa 	
Evaluate an improper integral and show that an improper integral diverges (LIM-4.A, LIM-6.A)		Determine both of the following using proper notation: <ul style="list-style-type: none"> Improper integral diverges Improper integral converges to a number <p>Follows math practices of algebraic computation, precision and reasoning*</p>	Determine one of the following using proper notation: <ul style="list-style-type: none"> Improper integral diverges Improper integral converges to a number 	Evaluate a limit using L'Hopital's Rule	

*Math Practices for AP Calculus include:

- Algebraic processes and computations completed logically and correctly
- Attend to precision graphically, numerically and analytically
- Clearly present reasoning and justification with accurate and precise language