

Test 4 learning objectives

April 6, 2016

1. Compute antiderivatives and indefinite integrals of power functions (including negative integer and fractional powers), exponential functions, and the function $\frac{1}{x}$, as well as combinations (involving sums and constant multiples) of these functions.
2. Compute definite integrals where the integrand is one of the above functions.
3. Set up and compute Riemann sums to estimate definite integrals.
4. Solve problems using antidifferentiation or integration, including problems which can be solved using the fundamental theorem of calculus. The following table lists the variety of problems.

	Given ...	find ...	Solution and/or interpretation
1	a formula for the rate of change $r(t)$ of a quantity (if the quantity is $y(t)$, we have $y'(t) = r(t)$)	the quantity $y(t)$	
2	the rate of change $r(t)$ of a quantity $y(t)$ on an interval $[a, b]$	the net change of $y(t)$ between a and b	
3	a graph of the rate of change $r(t)$ of a function $y(t)$ on an interval $[a, b]$	an estimate of the net change of $y(t)$ between a and b	
4	a formula for a function $f(x)$ on an interval $[a, b]$	$\int_a^b f(x)dx$	
5	the graph of a function $f(x)$ on interval $[a, b]$	an estimate of $\int_a^b f(x)dx$	
6	a formula for a function $f(x)$ on an interval $[a, b]$	the area bounded by $f(x)$ and the x -axis	
7	the velocity $v(t)$ of a moving body between two times a and b	the total distance traveled between a and b	
8	formulas for rates $r(t)$ and $q(t)$, which together comprise the change in a quantity on an interval $[a, b]$	the net change of $y(t)$ between a and b	

5. Compute indefinite and definite integrals using substitution.