

Math 152 Practice Final ©2006 PLU

1. A table of values for an increasing function is given at right.
 - (a) Use an appropriate Riemann sum to overestimate the integral.
 - (b) Use the Trapezoid Rule to estimate the integral.

x	0	5	10	15	20
$f(x)$	-3	2	4	4.5	5

2. Integrate $\int_2^{2\sqrt{2}} \frac{x}{\sqrt{x^2-4}} dx$ by (a) a u -substitution, (b) a trig substitution.
3. Integrate $\int x \cdot \arctan x dx$.
4. Let R be the region bounded by the x -axis and curves $y = \tan x \sec^2 x$ and $x = \frac{\pi}{4}$. Find the volume of the solid obtained by rotating R about the x -axis.
5. A ball drops from a height of 6 ft and bounces back $\frac{2}{3}$ of its previous height each time it hits the ground. Find the total vertical distance traveled by the ball.
6. Consider function $\ln(x)$. (a) Find its Taylor series at $a = 2$. (b) Find its interval of convergence.
7. Let y be a function with MacLaurin series $c_0 + c_1x + c_2x^2 + c_3x^3 + c_4x^4 + \dots$. If y is known to satisfy differential equation $\frac{dy}{dx} = x \cdot y + 1$ (which is *not* separable) and $y(0) = 1$, find c_0, c_1, c_2, c_3 , and c_4 .

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