WebAssign
Section 8.4 (fa16) (Homework)

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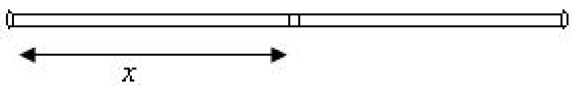
Math 129, section 05, Fall 2016
Instructor: William Conway

Current Score : 26 / 26 **Due :** Sunday, October 9 2016 11:59 PM MST

The due date for this assignment is past. Your work can be viewed below, but no changes can be made.

1. 3/3 points | Previous Answers

A rod has length 7 meters. At a distance x meters from its left end, the density of the rod is given by $\delta(x) = 6x + 9$ gm/m.



(a) Find the approximate mass of the slice at a distance of x meters from the left end. You can write Delta or use Δ in the CalcPad.

$$(6x+9)Δx

(b) Find the exact total mass of the rod.

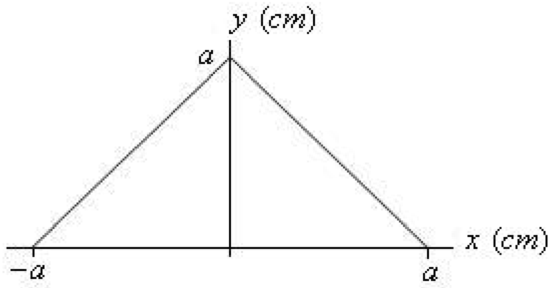
mass =

$$210

gm

2. 4/4 points | Previous Answers

Consider the triangular region shown below with density $\delta(x)$ = 6 + x grams/cm^2 and a = 4.



(a) Can the total mass of the triangular region be found using a single integral?

- Yes
- No

(b) Find an approximation for the mass of a slice x units to the right of the y-axis, having width Δx.

$$(6+x)(-x+4)\Delta x

Find an approximation for the mass of a slice x units to the left of the y-axis, having width Δx.

$$(6+x)(x+4)\Delta x

(b) Find the total mass.

mass =

$$2883

grams

3. 4/4 points | Previous Answers

The density of oil in a circular oil slick on the surface of the ocean at a distance of r meters from the center of the slick is given by

$$p(r) = \frac{100}{1 + r} \text{ kg/m}^2$$

(a) What are the shapes of the slices?

- ○ Circles of radius r meters with centers at the center of the oil slick.
- ○ Thin horizontal strips at a distance of r meters from the center of the oil slick.
- ◉ Thin rings with radius r meters, centered at the center of the oil slick.

Why?

- ○ The oil slick is a circle.
- ○ We always slice circles into horizontal strips.
- ◉ The density is approximately constant at a distance of r meters from the center of the slick.

(b) Find an approximation for the mass of a slice. Use Delta or Δ from the CalcPad.

$$200πr1+rΔr

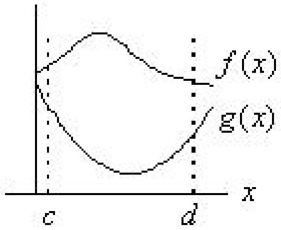
(c) Find the exact mass of oil when the radius of the slick is 80 meters.

$$200π(80−ln(81))

kg

4. 3/3 points | Previous Answers

A cardboard figure has the shape shown below. The region is bounded on the left by the line $x = c$, on the right by the line $x = d$, above by $f(x)$, and below by $g(x)$. The density $p(x)$ in gm/ cm^2 varies only with x.



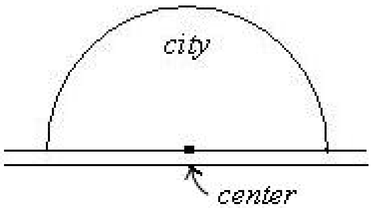
Find the integral needed for the total mass of the figure. Use all lower case letters.

$$\int_{c}^{d} p(x)(f(x)-g(x))\,dx$$

5. 6/6 points | Previous Answers

A city along the edge of a river is semi-circular shaped with radius 15 miles. In each case below, determine the shape of the strip that would be appropriate for the given population density. Then write a definite integral to represent the total population in the city.

(a) The population density is $p(x) = -20x + 500$ people per square mile where x is the distance in miles from the center of the city.

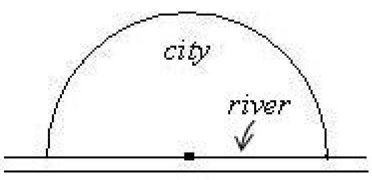


$$15

∫ $$(−20x+500)πx dx

$$0

(b) The population density is $p(x) = 200$ people per square mile where x is the vertical distance in miles from the river.



$$15

∫ $$400√225−x2 dx

$$0

6. 2/2 points | Previous Answers

A car moving at a speed of v mph achieves 23 + 0.1v mpg (miles per gallon) for v between 20 and 60 mph. Your speed as a function of time, t, in hours, is give by

v = 50 t/(t+1)

(a) Which of the following integrals will give the total number of gallons of gas consumed between t = 2 and t = 3 hours?

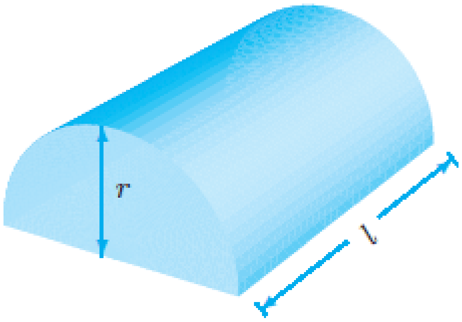
- (selected) $\int_2^3 \frac{50t}{23+28t}dt$
- $\int_2^3 \frac{23+28t}{50t}dt$
- $\int_2^3 \frac{23+28t}{t+1}dt$
- $\int_2^3 \frac{50t\cdot(23+28t)}{(t+1)^2}dt$
- $\int_2^3 \frac{t+1}{23+28t}dt$

(b) Evaluate the integral in part (a). Round your answer to 2 decimal places.

1.34 gallons

7. 4/4 points | Previous Answers

The storage shed in the figure is the shape of a half-cylinder of radius r meters and length l meters.



(a) The shed is filled with sawdust whose density (kg/m^3) at any point is proportional to the distance of that point from the floor. Write a formula for the density, d, as a function of x, the distance from the floor in meters. Use lower case k as the proportionality constant.

$d(x)$ =

$$kx

(b) Write the integral needed to find the total mass of the sawdust in the shed (in kg). Use all lower case letters.

$\int_{\$\$0}^{\$\$r}$ $$2lkx√r2−x2 dx