WeBWorK assignment number Exercises_1

This is an exercise assignment, treated differently from ordinary WeBWork assignments. The WeBWork due date is the same as the opening date, so that answers are available to students immediately. Students are to print the assignment and work the problems on paper. That work will be collected periodically and graded for effort. Exercises are worth 20 points (4% of the overall grade).

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1. (1 pt) Library/maCalcDB/setIntegrals22Average/ur_in_22_3.pg

Find the average value of : $f(x) = 6\sin x + 8\cos x$
on the interval $[0, 19\pi/6]$

Average value = ____________

Correct Answers:

- `0.723349407989354`

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2. (1 pt) Library/maCalcDB/setIntegrals20Volume/osu_in_20_11.pg

As viewed from above, a swimming pool has the shape of the ellipse

$$\frac{x^2}{4900} + \frac{y^2}{2500} = 1$$

The cross sections perpendicular to the ground and parallel to the y-axis are squares. Find the total volume of the pool. (Assume the units of length and area are feet and square feet respectively. Do not put units in your answer.)

V = ____________

Correct Answers:

- `933333.333333333`

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3. (1 pt) Library/maCalcDB/setIntegrals20Volume/osu_in_20_9.pg

The region between the graphs of $y = x^2$ and $y = 5x$ is rotated around the line $y = 25$.

The volume of the resulting solid is ____________

Correct Answers:

- `1963.49540849362`

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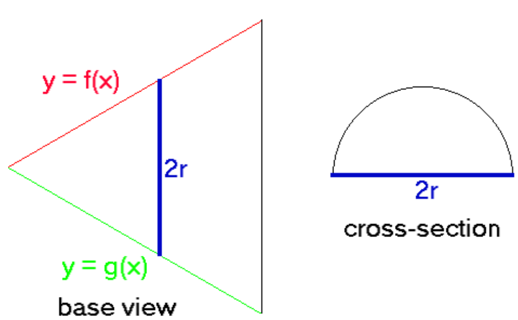
4. (1 pt) Library/maCalcDB/setIntegrals20Volume/osu_in_20_5-/osu_in_20_5.pg



The base of a certain solid is an equilateral triangle with altitude 14. Cross-sections perpendicular to the altitude are semicircles. Find the volume of the solid, using the formula

$$V = \int_a^b A(x)\,dx$$

applied to the picture shown above (click for a better view), with the left vertex of the triangle at the origin and the given altitude along the x-axis.

Note: You can get full credit for this problem by just entering the final answer (to the last question) correctly. The initial questions are meant as hints towards the final answer and also allow you the opportunity to get partial credit.

The lower limit of integration is a = ____________

The upper limit of integration is b = ____________

The diameter $2r$ of the semicircular cross-section is the following function of x: ____________

$A(x)$= ____________

Thus the volume of the solid is V = ____________

Correct Answers:

- `0`
- `14`
- `2*x/sqrt(3)`
- `pi*x^2/6`
- `478.918346747244`

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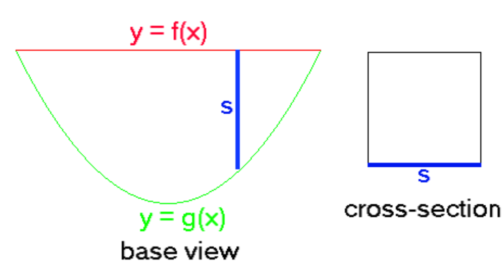
5. (1 pt) Library/maCalcDB/setIntegrals20Volume/osu_in_20_3-/osu_in_20_3.pg



The base of a certain solid is the area bounded above by the graph of $y = f(x) = 16$ and below by the graph of $y = g(x) = 36x^2$. Cross-sections perpendicular to the x-axis are squares. (See picture above, click for a better view.)

Use the formula

$$V = \int_a^b A(x)\,dx$$

to find the volume of the solid.

Note: You can get full credit for this problem by just entering

the final answer (to the last question) correctly. The initial questions are meant as hints towards the final answer and also allow you the opportunity to get partial credit.
The lower limit of integration is a = ______

The upper limit of integration is b = ______

The side s of the square cross-section is the following function of x: ______

$A(x)$= ______

Thus the volume of the solid is V = ______

Correct Answers:

- `-0.666666666666667`
- `0.666666666666667`
- `16-36*x^2`
- `(16-36*x^2)^2`
- `182.044444444444`

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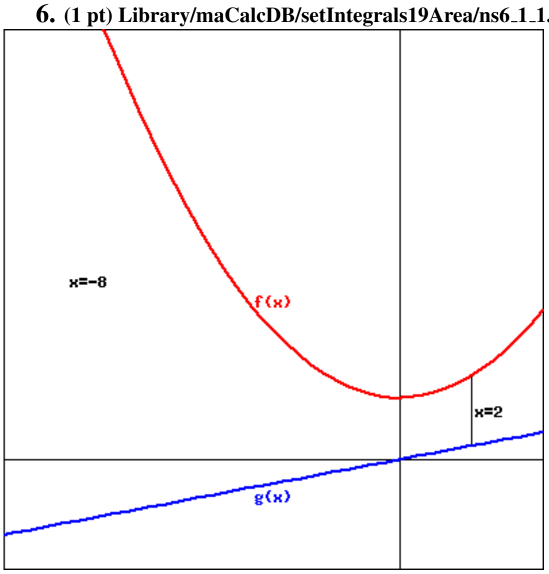
6. (1 pt) Library/maCalcDB/setIntegrals19Area/ns6_1_1.pg



Note: you can click on the graph to get a better view of it.

Find the area enclosed between $f(x) = 0.8x^2 + 9$ and $g(x) = x$ from $x = -8$ to $x = 2$.

Answer: ______

Correct Answers:

- `(0.8 /3)*(2^3 -(-8)^3) + (8^2 -2^2)/2 + 9*(2 +8)`

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7. (1 pt) Library/maCalcDB/setIntegrals19Area/osu_in_19_14.pg

Consider the area between the graphs $x+2y = 20$ and $x+4 = y^2$. This area can be computed in two different ways using integrals.

First of all it can be computed as a sum of two integrals

$$\int_a^b f(x)\,dx + \int_b^c g(x)\,dx$$

with the following values:
$a =$ ______
$b =$ ______
$c =$ ______
$f(x) =$ ______
$g(x) =$ ______

Alternatively this area can be computed as a single integral

$$\int_\alpha^\beta h(y)\,dy$$

with the following values:
$\alpha =$ ______
$\beta =$ ______
$h(y) =$ ______

Either way we find that the area is ______.

Correct Answers:

- `-4`
- `12`
- `32`
- `2*sqrt(x+4)`
- `(20 - x)/2 + sqrt(x+4)`
- `-6`
- `4`
- `20 - 2*y - y^2 + 4`
- `166.666666666667`

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8. (1 pt) Library/maCalcDB/setIntegrals19Area/ur_in_19_1.pg

Find $c > 0$ such that the area of the region enclosed by the parabolas $y = x^2 - c^2$ and $y = c^2 - x^2$ is 10.
$c =$ ______

Correct Answers:

- `1.55361625297693`

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9. (1 pt) Library/ma123DB/set1/s6_2_0.pg

Find the volume of the solid formed by rotating the region enclosed by

$$x = 0,\ x = 1,\ y = 0,\ y = 8 + x^4$$

about the x-axis.

Answer: ______

Correct Answers:

- `pi*8*8+(pi*2*8/(1+4))+(pi/(1+2*4))`

10. **(1 pt) Library/ma123DB/set1/s6_2_13.pg**

Find the volume of the solid obtained by rotating the region bounded by

$$y = x^6, y = 1;$$

about the line $y = 3$

Answer: ____________________

Correct Answers:

- `2*pi*(2*3 - 1 - 2*3/(6+1) + 1/(2*6 + 1))`

11. **(1 pt) Library/ma123DB/set1/s6_2_17.pg**

Find the volume of the solid obtained by rotating the region bounded by the given curves about the line $x = -7$

$$y = x^2,\ x = y^2$$

Answer: ____________________

Correct Answers:

- `pi*(3/10+2*7/3)`

12. **(1 pt) Library/ma122DB/set13/s6_5_7.pg**

Find the average value of $f(x) = \cos^4 x \sin x$ on the interval $[0,7]$

Answer: ________

Correct Answers:

- `(1-((cos(7)))^5)/(5*7)`

13. **(1 pt) Library/Rochester/setIntegrals20Volume-/S06.02.VolumesByWashers.PTP19b.pg**

The volume of the solid obtained by rotating the region enclosed by

$$y = x^2, \qquad x = y^2$$

about the line $x = -1$ can be computed using the method of disks or washers via an integral

$$V = \int_a^b \underline{\hspace{6cm}} \ \boxed{?}$$

with limits of integration $a =$ _____ and $b =$ _____.

Correct Answers:

- `pi*(1 + sqrt(y))**2 - pi*(1 + y**2)**2`
- `dy`
- `0`
- `1`