1. (1 point) (a) Find the average value of $f(x) = 25 - x^2$ on the interval $[0,5]$.

Answer: _____

(b) Find a value c in the interval $[0,5]$ such that $f(c)$ is equal to the average value.

Answer: _____

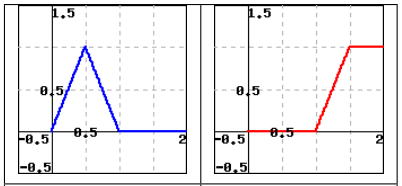
2. (1 point) In a certain city the temperature (in degrees Fahrenheit) t hours after 9am was approximated by the function

$$T(t) = 30 + 17\sin\left(\frac{\pi t}{12}\right)$$

Determine the temperature at 9 am. _____
Determine the temperature at 3 pm. _____

Find the average temperature during the period from 9 am to 9 pm. _____

3. (1 point)
The figure below to the left is a graph of $f(x)$, and below to the right is $g(x)$.



$f(x)$ $g(x)$

(a)
What is the average value of $f(x)$ on $0 \le x \le 2$?
avg value = _____
(b)
What is the average value of $g(x)$ on $0 \le x \le 2$?
avg value = _____
(c)
What is the average value of $f(x) \cdot g(x)$ on $0 \le x \le 2$?
avg value = _____
(d)
Is the following statement true?

$$\text{Average}(f) \cdot \text{Average(g)} = \text{Average}(f \cdot g)$$

- A. Yes
- B. No

4. (1 point)
The average value of the function $v(x) = 5/x^2$ on the interval $[1,c]$ is equal to 1. Find the value of c.
$c =$ _____

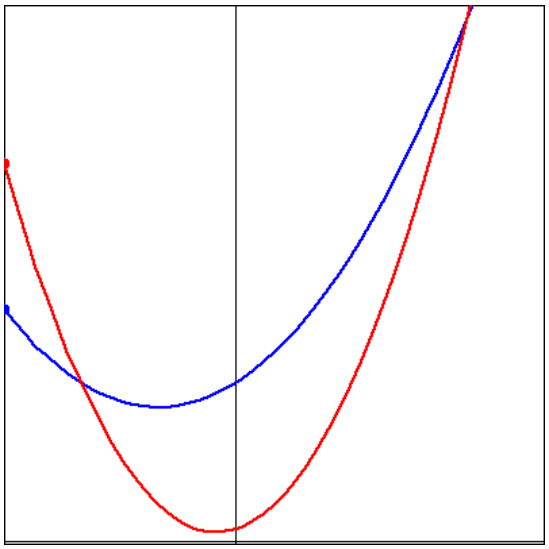
5. (1 point)
The volume of the solid obtained by rotating the region enclosed by

$$y = e^{4x} + 3, \quad y = 0, \quad x = 0, \quad x = 0.2$$

about the x-axis can be computed using the "disk method" via the integral

$$V = \int_a^b \_\_\_\_\_ \boxed{?}$$

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



6. (1 point)
Find the area of the region enclosed between $f(x) = x^2 + 4x + 26$ and $g(x) = 2x^2 + 2x + 2$.
Area = _____
(**Note:** The graph above represents both functions f and g but is intentionally left unlabeled.)

7. (1 point)

Demonstrate how to find the area of the region 'R' bounded between the graphs 'x + 3y = 13' and 'x + 5 = y^2' by dragging all relevant statements below into the **right column** in an appropriate order.

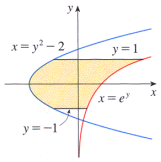
(Leave all irrelevant or incorrect statements in the left column.)

0. hence its area is equal to the integral $\int_{-6}^{3}(y^2-5-13+3y)\,dy$
1. hence its area is equal to the integral $\int_{-6}^{3}(13-3y-y^2+5)\,dy$
2. on the right by $x=y^2-5$,
3. $=-121.5$
4. on the left by $x=y^2-5$,
5. $=\left(13y-\frac{3}{2}y^2-\frac{1}{3}y^3+5y\right)\Big|_{-6}^{3}$
6. $=121.5$
7. on the right by $x=13-3y$,
8. The region R can be viewed as a region bounded
9. over the interval $[-6,3]$ on the y-axis,
10. $=\left(\frac{1}{3}y^3-5y-13y+\frac{3}{2}y^2\right)\Big|_{-6}^{3}$
11. on the left by $x=13-3y$,

---

8. (1 point)

Find the area of the shaded region below.



Area = _____

---

9. (1 point)

Find the area of the region between the curves $y=|x|$ and $y=x^2-2$.

Area between curves = _____

---

10. (1 point) Find the volume of the solid obtained by rotating the region bounded by

$$y=4x^2, x=1, y=0,$$

about the x-axis.

Answer: _____

---

11. (1 point)

Find the volume of the solid obtained by rotating the region bounded by the curves $y=\tan^2(x)$, $x=\pi/4$, $x=0$, and $y=0$ about the x-axis.

Volume = _____

---

12. (1 point) Find the volume of the solid obtained by rotating the region bounded by

$$x=2y^2,\ y=1,\ x=0,$$

about the y-axis.

Answer: _____

---

13. (1 point) Let R be the region bounded by the circle $x^2+y^2=1$ and let S be the solid obtained by rotating R about the axis $y=-5$.

The volume of $S=\pi\int_{-1}^{1}$ _____ dx.

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14. (1 point) Find the volume of the solid obtained by rotating the region in the first quadrant bounded by the curves $x=0$, $y=1$, $x=y^4$, about the line $y=1$.

Volume: _____

---

15. (1 point)

Find the volume of the solid that results when the region bounded by $y=\sqrt{x}$, $y=0$ and $x=49$ is revolved about the line $x=49$.

Volume = _____