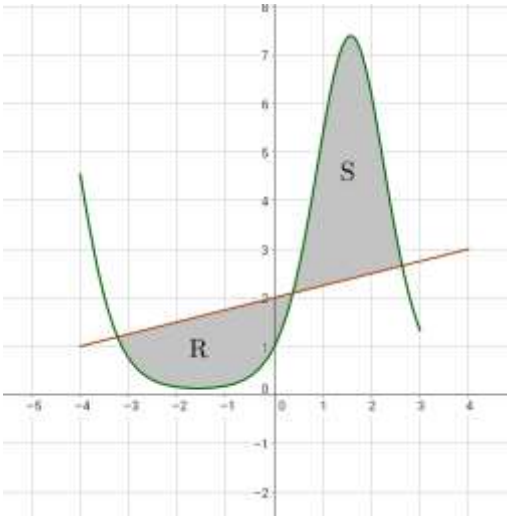
I-A4b

<u>Big Ol Practice Assessment</u>

1. Let $f(x) = e^{2\sin x}$ and $g(x) = \frac{1}{4}x + 2$ be the boundaries of the regions R and S. Find the total area of R and S.



I-U7: Given $\int_0^5 f(x)\,dx = 10$ $\int_5^7 f(x)\,dx = 3$ $\int_{-2}^5 f(x)dx = -2$ Find each of the following:

2. $\int_7^{-2} f(x)\,dx$

3. $\int_0^{-2} f(x)dx$

I-U4

Let $f(x) = \int_{-4}^{x^2} 4t^2 - 4t + 1\,dt$.

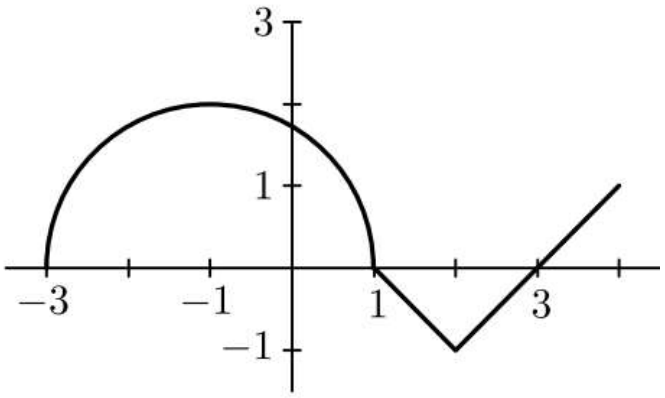
4. Find $f'(x)$. Simplify your answer.

5. Find all intervals where $f(x)$ is decreasing. Justify your answer.

I-U9

The function *a(t)* is shown over [-3,4] and consists of line segments and a semicircle.

Let $Q(x) = \int_1^x a(t)\,dt$



6. Find $Q(-1)$, $Q'(2)$, and $Q''(3)$.

7. Find the relative minima of $Q(x)$, if any, over [-3,3]. Justify your answer.

8. Find where $Q(x)$ has an absolute minimum value on $[-3,3]$. Show all calculations.

I-A7b

9. It's 10am and Frank has already used 8 mb of data on his cell phone. From 10am to midnight (t=24), his data usage rate can be modeled by the differentiable function $f(t) = \sin\left(\frac{\pi}{8}t\right) + 1$ mb/hr. First, write an equation that includes an integral that will give the amount of data Frank has used as of midnight. Then, find that amount and include units in your answer.

I-A7a

10. Find the average value of $f(x) = \frac{1}{x}$ over the interval [1,3]

11. Let $Z'(t) = 1 - \cos(\frac{\pi t}{5})$ model the rate, in hundreds of people per hour, enter an amusement park. Using correct units, explain the meaning of $\frac{1}{5}\int_2^7 Z'(t)\,dt$ in context. Then, find its value.

I-U3a

12. Find the left rectangle approximation for $\int_5^7 \ln(3x)\,dx$ using 4 rectangles of equal width. [3 decimal places of accuracy]. Is the approximation an under or an overestimate? Justify your response.

I-U3c

13. An awesome rocket ship is in the air and doing cool rocket things. Its velocity $v(t)$ is a differentiable, strictly increasing function. Selected values are given below. Using correct units, explain the meaning of $\int_2^{10} v(t)\,dt$ in the context of this problem. Then, approximate the value of $\int_2^{10} v(t)\,dt$ using the 4 trapezoids indicated by the table.

t	2	4	6	8	10
$v(t)$, m/s	12	18	27	38	52

I-A1

14. $\int \frac{\sqrt{x^3}-2}{\sqrt{x}}\,dx$

15. $\frac{1}{2}\int \frac{2}{x}\,dx$

16. $\int \csc^2\theta\,d\theta$

17. $\int 4^t \ln 4\,dt$