Quiz 10

ⓘ This is a preview of the published version of the quiz

Started: Dec 5 at 12:16pm

Quiz Instructions

Choose the best solution choice for each multiple-choice problem. For problems that require an exact numerical answer, the answer will always be an integer. The problems vary in value from 1 to 2 points.

Question 1

2 pts

Using four subintervals of equal length and right subinterval endpoints, write the Riemann sum for $f(x) = \sin x$ over $[0, 1]$. Which one of these is that Riemann sum?

- [x] $\sin(0.25) \cdot 0.25 + \sin(0.5) \cdot 0.25 + \sin(0.75) \cdot 0.25 + \sin(1) \cdot 0.25$
- [ ] $\sin(0) \cdot 0.25 + \sin(0.25) \cdot 0.25 + \sin(0.5) \cdot 0.25 + \sin(0.75) \cdot 0.25 + \sin(1) \cdot 0.25$
- [ ] $\sin(0) \cdot 0.25 + \sin(0.25) \cdot 0.25 + \sin(0.5) \cdot 0.25 + \sin(0.75) \cdot 0.25$
- [ ] $\sin(0.125) \cdot 0.25 + \sin(0.375) \cdot 0.25 + \sin(0.625) \cdot 0.25 + \sin(0.875) \cdot 0.25$

See attached sheet.

Question 2

1 pts

Think about the region above the x-axis and below the graph of $f(x) = x^2$ over the interval from $x = 0$ to $x = 2$. (It will probably be a good idea for you to sketch that region.) If you computed a Riemann sum for f using 10 subintervals and left subinterval endpoints, would your Riemann sum underestimate or overestimate the area of the region?

- [ ] Overestimate
- [x] Underestimate

See attached sheet.

Question 3

2 pts

Using five subintervals of equal length and right subinterval endpoints, compute the Riemann sum for $f(x) = \frac{1}{x}$ over $[1, 2]$.

$\Delta x = \frac{2-1}{5} = 0.2 \Rightarrow$ PARTITION: $1, 1.2, 1.4, 1.6, 1.8, 2$

RIGHT ENDPTS $\Rightarrow c_1 = 1.2,\ c_2 = 1.4,\ c_3 = 1.6,$
$c_4 = 1.8,\ c_5 = 2$

RIEMANN SUM $= \left(\frac{1}{1.2}\right)(0.2) + \left(\frac{1}{1.4}\right)(0.2) + \left(\frac{1}{1.6}\right)(0.2)$
$+ \left(\frac{1}{1.8}\right)(0.2) + \left(\frac{1}{2}\right)(0.2) \approx 0.6456\ldots$

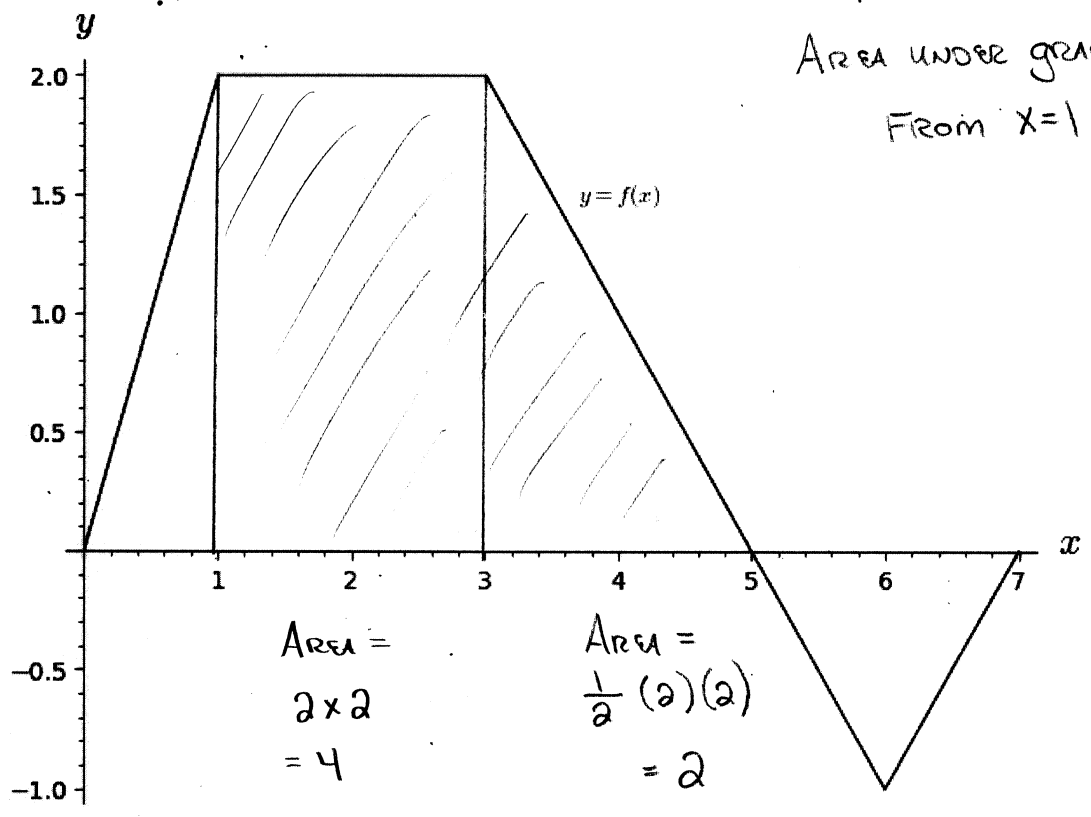
- [x] 0.645635
- [ ] 0.745635
- [ ] 0.693147
- [ ] 0.845635

Question 4

2 pts

The graph of the function f is shown below. Use area to evaluate $\int_1^5 f(x)\,dx$.

AREA UNDER GRAPH
FROM $x=1$ TO $x=5$



AREA = $2 \times 2 = 4$

AREA = $\frac{1}{2}(2)(2) = 2$

TOTAL AREA $= 4 + 2 = 6$

- [ ] 5
- [ ] 6.5
- [ ] 7
- [x] 6

Question 5

2 pts

Suppose you know that $\int_0^3 2x^2\,dx = A$ and $\int_0^3 x\,dx = B$. What is the value of $\int_3^0 (3x^2 - 7x)\,dx$ in terms of A and B?

- ○ $\frac{1}{7}B - 6A$
- ○ $\frac{3}{2}A - 7B$
- ○ $6A - 7B$
- ✳ $7B - \frac{3}{2}A$

$$\int_3^0 (3x^2 - 7x)\,dx = -\int_0^3 (3x^2 - 7x)\,dx$$

$$= -\frac{3}{2}\int_0^3 2x^2\,dx + 7\int_0^3 x\,dx$$

$$= -\frac{3}{2}A + 7B$$

Question 6

1 pts

What is the exact value of the definite integral $\int_\pi^\pi x\cos(x^3)\,dx$?

Enter your exact numerical answer in the box below.

Upper bound = Lower bound

0

Saving... Submit Quiz

Question 1

$f(x) = \sin(x)$ on $[0,1]$

$$\Delta x = \frac{1-0}{4} = \frac{1}{4}$$

Partition: $x_0 = 0,\ x_1 = \frac{1}{4},\ x_2 = \frac{1}{2},\ x_3 = \frac{3}{4},\ x_4 = 1$

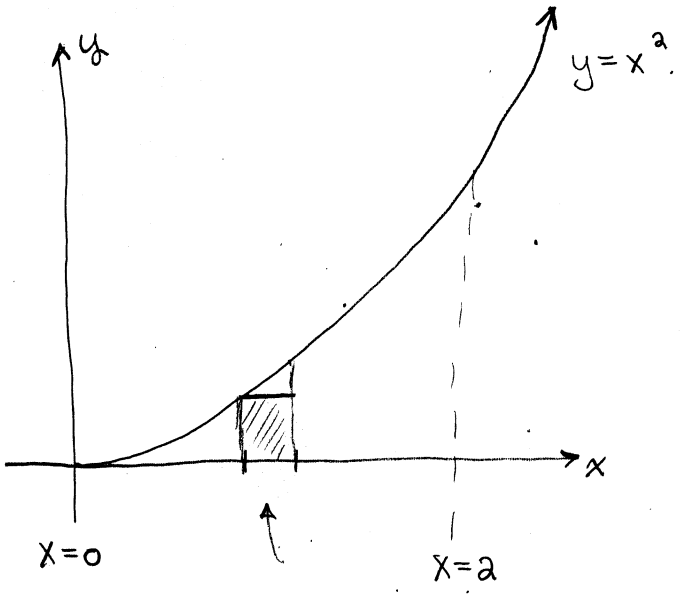
Using right endpoints: $c_1 = \frac{1}{4},\ c_2 = \frac{1}{2},\ c_3 = \frac{3}{4},\ c_4 = 1$

$$\text{Riemann Sum} = \sum_{k=1}^{4} \sin(c_k)\,\Delta x$$

$$= \sin\left(\frac{1}{4}\right)\cdot\left(\frac{1}{4}\right) + \sin\left(\frac{1}{2}\right)\cdot\left(\frac{1}{4}\right)$$

$$+ \sin\left(\frac{3}{4}\right)\cdot\left(\frac{1}{4}\right) + \sin(1)\cdot\left(\frac{1}{4}\right)$$

Question 2



Here is just one of the "rectangles" from the Riemann sum. The rectangle is <u>under</u> the curve. This is true for all the rectangles when we measure their heights at the left.

⇓

Underestimate