

# Left- and Right-Hand Sums - Answer Key

Estimate the area using LHS/RHS between the graph of the function and  $x$ -axis for problems 1 - 8.

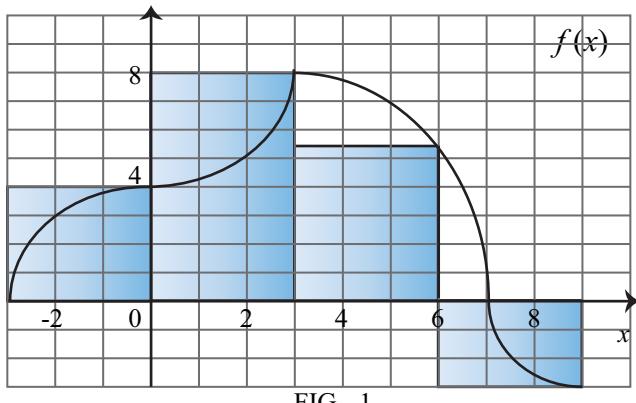


FIG - 1

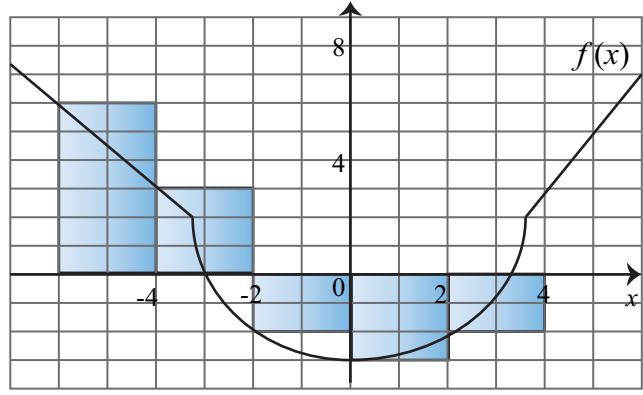


FIG - 2

1. Using LHS(3) for  $f(x) = x^2 - 2x$  in  $[0, 3]$ .

Ans: -1.

2. Using RHS(3) for  $f(x) = x^2 - 2x$  in  $[0, 3]$ .

Ans: -1.125.

3. Using LHS(3) for  $f(x) = \sin(2x)$  on  $(0, \frac{3\pi}{4})$ .

Ans:  $\frac{\pi}{4}$ .

4. Using RHS(2) for  $f(x) = \cos(4x)$  on  $(0, \frac{\pi}{8})$ .

Ans:  $\frac{\pi}{16\sqrt{2}}$ .

5. Shade and estimate RHS(4) in Fig-1 for  $f(x)$  in  $[-3, 9]$ .

Ans: 43.5.

6. Shade and estimate LHS(5) in Fig-2 for

$f(x)$  in  $[-6, 4]$ .

Ans: 4.

7. Using RHS for  $f(x)$  in  $[-1, 10]$

$x$	-1	3	4	6	10
$f(x)$	5	-2	3	5	7

Ans: 33

8. Using LHS for  $f(x)$  in  $[3, 10]$

$x$	-1	3	4	6	10
$f(x)$	5	-2	3	5	7

Ans: 26

9. For  $f(x) = 2x - 4$  on  $[3, 6]$ , how large must  $n$  be such that  $|LHS(n) - RHS(n)| < 0.1$ ? Ans: 181.

10. For  $f(x) = e^x$  on  $[0, 1]$ , how large must  $n$  be such that  $\left| \int_0^1 f(x)dx - RHS(n) \right| < 0.5$ ? Ans: 4.

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