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.

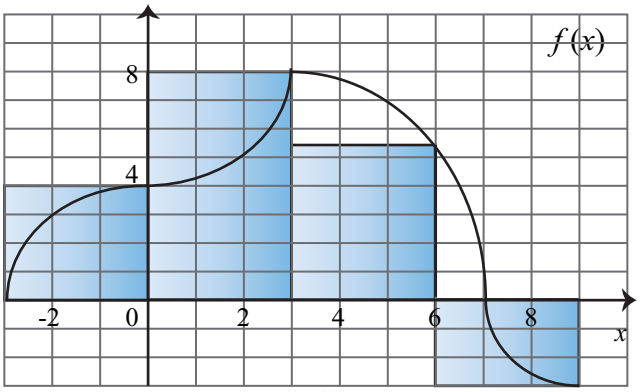

FIG - 1

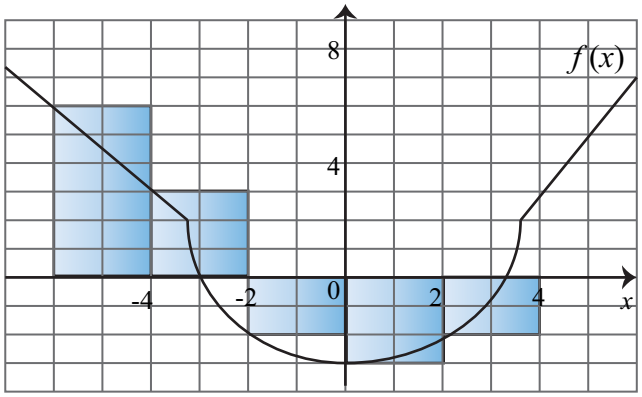

FIG - 2

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 $\left(0, \frac{3\pi}{4}\right)$.
   Ans: $\frac{\pi}{4}$.

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