

FIGURE 5.5 The rock in Example 3. The height 256 ft is reached at $t = 2$ and $t = 8$ sec. The rock falls 144 ft from its maximum height when $t = 8$.

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TABLE 5.3 Velocity Function

t	$v(t)$	t	$v(t)$
0	160	4.5	16
0.5	144	5.0	0
1.0	128	5.5	-16
1.5	112	6.0	-32
2.0	96	6.5	-48
2.5	80	7.0	-64
3.0	64	7.5	-80
3.5	48	8.0	-96
4.0	32		

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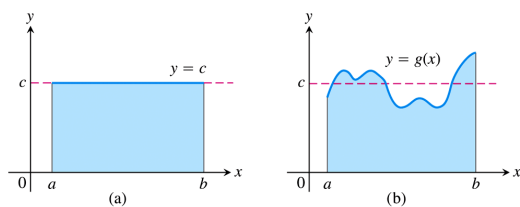


FIGURE 5.6 (a) The average value of $f(x) = c$ on $[a, b]$ is the area of the rectangle divided by $b - a$. (b) The average value of $g(x)$ on $[a, b]$ is the area beneath its graph divided by $b - a$.

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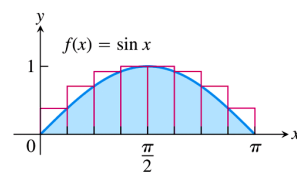


FIGURE 5.7 Approximating the area under $f(x) = \sin x$ between 0 and π to compute the average value of $\sin x$ over $[0, \pi]$, using eight rectangles (Example 4).

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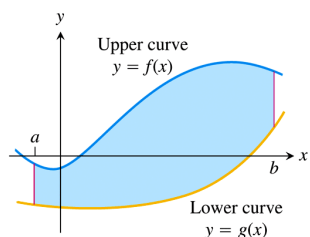


FIGURE 5.25 The region between the curves $y = f(x)$ and $y = g(x)$ and the lines $x = a$ and $x = b$.

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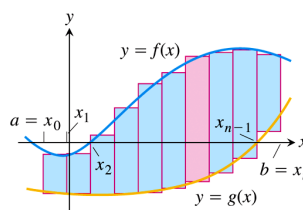


FIGURE 5.26 We approximate the region with rectangles perpendicular to the x -axis.

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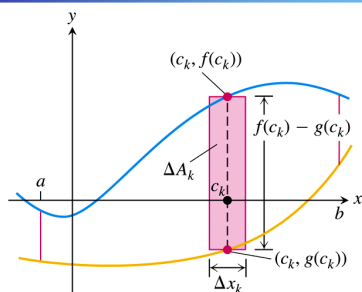


FIGURE 5.27 The area ΔA_k of the k th rectangle is the product of its height, $f(c_k) - g(c_k)$, and its width, Δx_k .

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DEFINITION If f and g are continuous with $f(x) \geq g(x)$ throughout $[a, b]$, then the area of the region between the curves $y = f(x)$ and $y = g(x)$ from a to b is the integral of $(f - g)$ from a to b :

$$A = \int_a^b [f(x) - g(x)] dx.$$

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