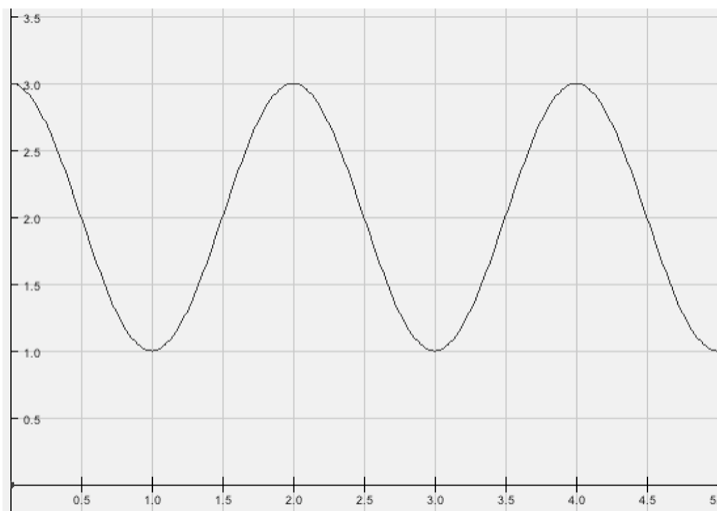
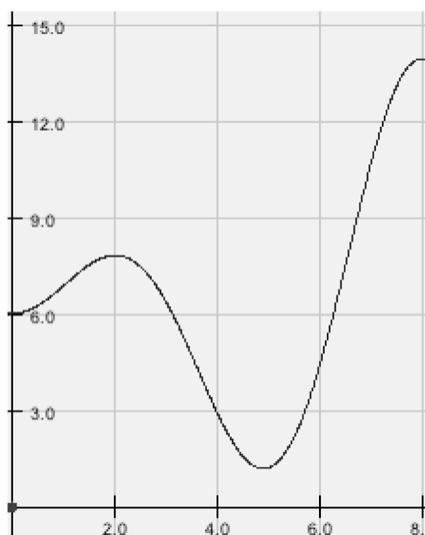


1. Below is a graph of $y = h(x)$. The interval from 0 to 5 has been partitioned into 10 subintervals of equal width, Δx . Let z_i = the right endpoint of the i th subinterval. Evaluate $\sum_{i=1}^{10} h(z_i) \Delta x$.



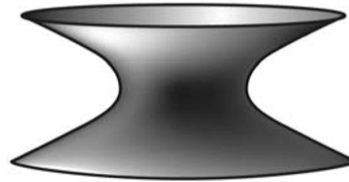
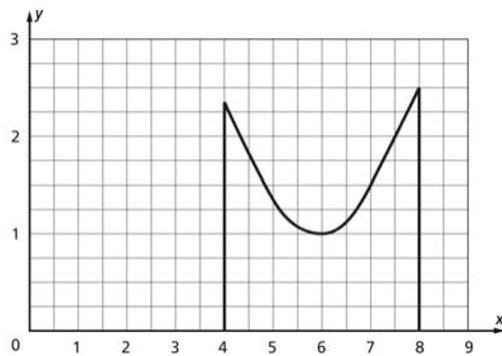
2. Below is a graph of $y = h(x)$. The interval from 0 to 8 has been partitioned into 4 subintervals of equal width, Δx . Let z_i = the right endpoint of the i th subinterval. Evaluate $\sum_{i=1}^4 h(z_i) \Delta x$.



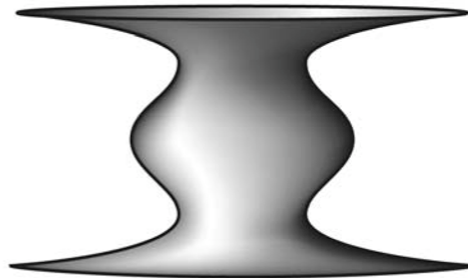
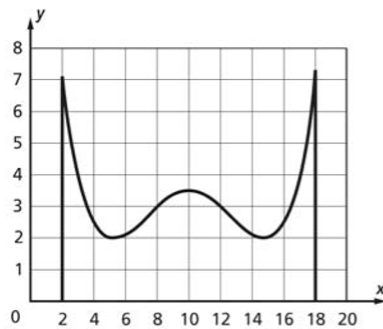
Consider the integral $\int_{-5}^5 \left(3 - \frac{1}{4}x\right) dx$.

3. Sketch the region whose area is indicated by the integral.
 4. Find the exact value of the integral.
 5. Evaluate $\int_{-3}^1 \sqrt{9 - x^2} dx + \int_1^3 \sqrt{9 - x^2} dx$.
 6. Given that $\int_0^{\ln 6} 2e^x dx = 10$, evaluate $\int_0^{\ln 6} 5e^x dx$.
 7. Given that $\int_0^{\ln 8} 7e^x dx = 49$, evaluate $\int_0^{\ln 8} 13e^x dx$.
 8. Suppose $f(x) = \int_0^x (3t^2 - 5) dt$. Find a formula for $f'(x)$.
 9. Suppose $f(x) = \int_{\pi}^x (8 - t^3) dt$. Find a formula for $f'(x)$.
 10. Over an 18-second period, a sports car accelerates in such a way that its velocity (in feet per second) at any time $0 \leq t \leq 18$ is given by $f(t) = \pm 0.66(t - 18)^2 + 213.84$.
What integral gives the distance traveled by the car during that 18-second period?
- Over a 15-second period, a bicyclist accelerates in such a way that his velocity (in feet per second) at any time $0 \leq t \leq 15$ is given by $f(t) = \pm 0.12(t - 15)^2 + 27$.
11. What integral gives the distance traveled by the bicyclist during that 15-second period?
 12. What distance does the bicyclist travel during that 15-second period?

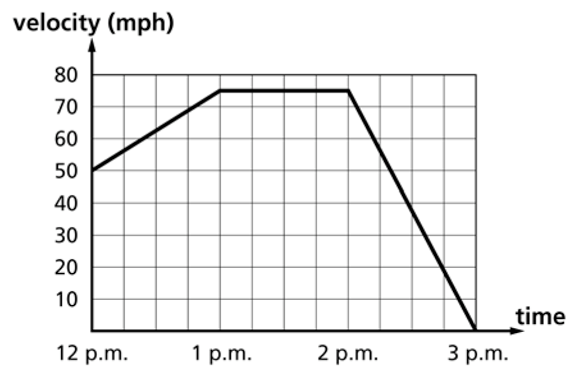
13. Use the grid and left endpoints of the rectangles for 4 subintervals of equal length to find a Riemann sum to estimate the volume of the vase below.



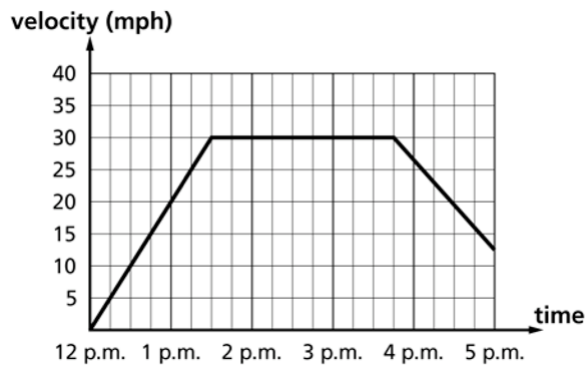
14. Use the grid and left endpoints of the rectangles for 8 subintervals of equal length to find a Riemann sum to estimate the volume of the vase below.



15. The velocity-time graph for a car is given in the accompanying figure. How far did the car travel from 12:00 p.m. to 3:00 p.m.?

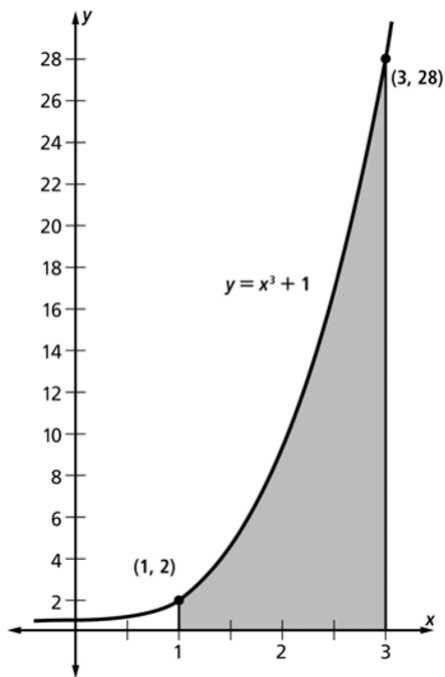


16. The velocity-time graph for a bicycle is given in the accompanying figure. How far did the bicyclist travel from 12:00 p.m. to 5:00 p.m.?



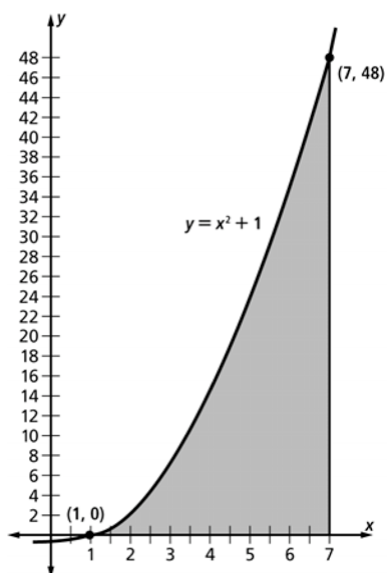
17. Sketch the region described by $\int_{-2}^{+1} \cos x \, dx$. Does the value of the integral appear to be positive or negative?

Consider this graph.



18. What integral gives the area of the shaded region?
19. Determine the area of the shaded region.

Consider this graph.



20. What integral gives the area of the shaded region?
21. Determine the area of the shaded region.
22. Find the exact volume of the solid formed when the region bounded by $x = 1$, $x = 7$, $y = 5x \pm 2$, and the x -axis is rotated about the x -axis.
23. Find the exact volume of the solid formed when the region bounded by $x = 2$, $x = 8$, $y = 2x + 3$, and the x -axis is rotated about the x -axis.