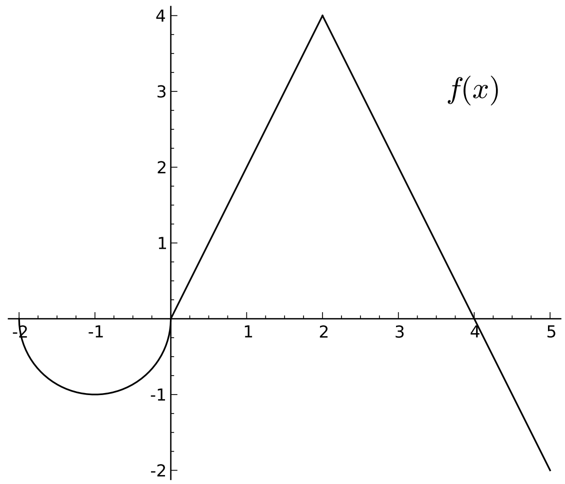
2. [18 points] The graph of the function $f(x)$, shown below, consists of line segments and a semicircle. Compute each of the following quantities.



a. [7 points]

1. $\int_0^2 f(x)dx = 4.$

2. $\int_{-2}^{2} |f(x)|dx = \frac{\pi}{2} + 4 \approx 5.57.$

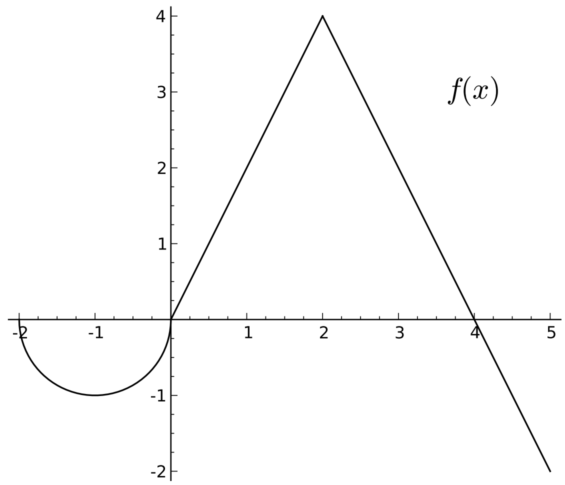
3. $\int_0^5 f(x)dx = 8 - 1 = 7.$

4. $\int_{-2}^{2} 2f(x)dx + \int_5^2 3f(x)dx = 2(4 - \frac{\pi}{2}) - 3(4-1) = -1 - \pi \approx -4.14.$

5. The average A of $f(x)$ on the interval $[-2, 5]$. $A = \frac{1}{7}\int_{-2}^{5} f(x)dx = \frac{7-\frac{\pi}{2}}{7} \approx .775.$

6. $\int_0^1 f(5x)dx = \frac{1}{5}\int_0^5 f(u)du = \frac{7}{5}.$

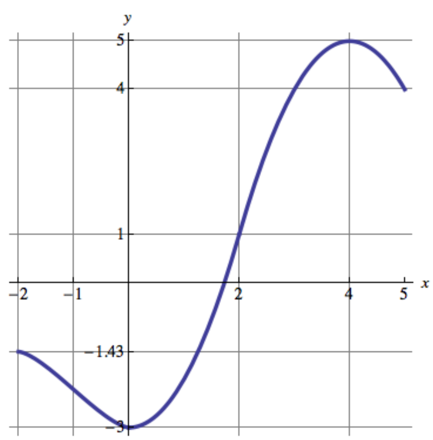
b. [4 points]



If $f(x)$ is the derivative of a function $g(x)$ with $g(2) = 1$, fill in the table of values of $g(x)$, provided below, at the specified points (the graph has been reproduced for your convenience):

x	-2	0	2	4	5
$g(x)$	$\frac{\pi}{2} - 3 \approx$ -1.429	-3	1	5	4

c. [5 points] Graph $g(x)$. Make sure your graph indicates the intervals on which $g(x)$ is increasing, decreasing, concave up, and concave down.



d. [2 points] Let $h(x) = \int_0^x f(t)dt$. Find a constant C such that $g(x) = h(x) + C$. Show all your work.

$$g(x) = 1 + \int_2^x f(t)dt = 1 + \int_0^x f(t)dt - \int_0^2 f(t)dt = 1 + h(x) - 4$$
$$g(x) = h(x) - 3.$$

$C = -3.$