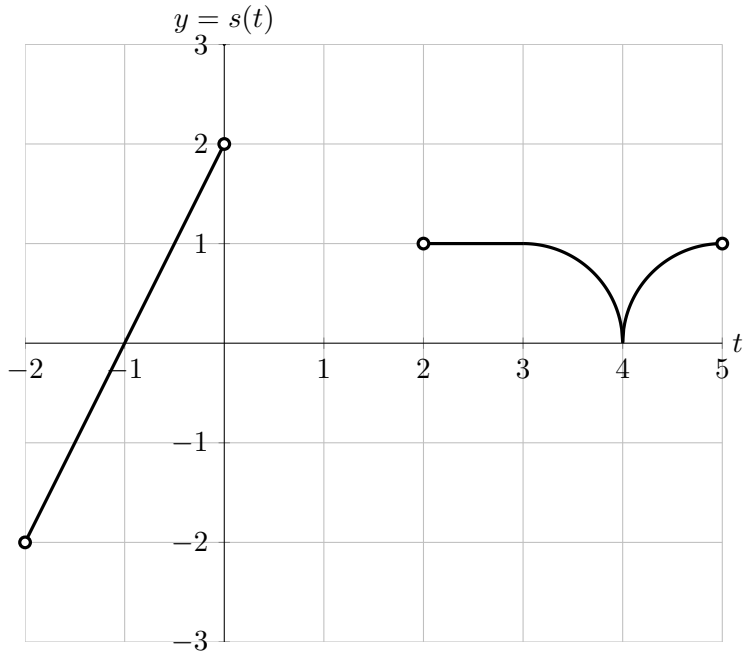
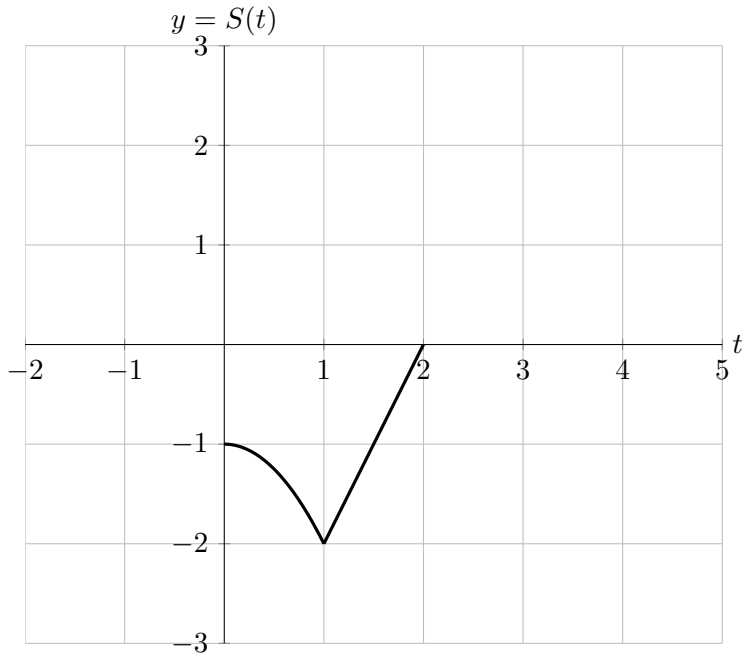
5. [12 points] A portion of the graphs of two functions $y = s(t)$ and $y = S(t)$ are shown below. Suppose that $S(t)$ is the continuous antiderivative of $s(t)$ passing through the point $(0, -1)$. Note that the graphs are linear anywhere they appear to be linear, and that on the intervals $(3, 4)$ and $(4, 5)$, the graph of $s(t)$ is a quarter circle.





a. [4 points] Use the portions of the graphs to fill in the *exact* values of $S(t)$ in the table below.

t	$S(t)$
-2	
-1	
0	-1
2	0
3	
5	

b. [8 points] On the axes above, sketch the missing portions of *both* s and S over the interval $-2 < t < 5$. Make sure to pay attention to:

- the values of $S(t)$ from the table above
- where S is and is not differentiable
- where S and s are increasing/decreasing/constant
- the concavity of the graph $y = S(t)$.