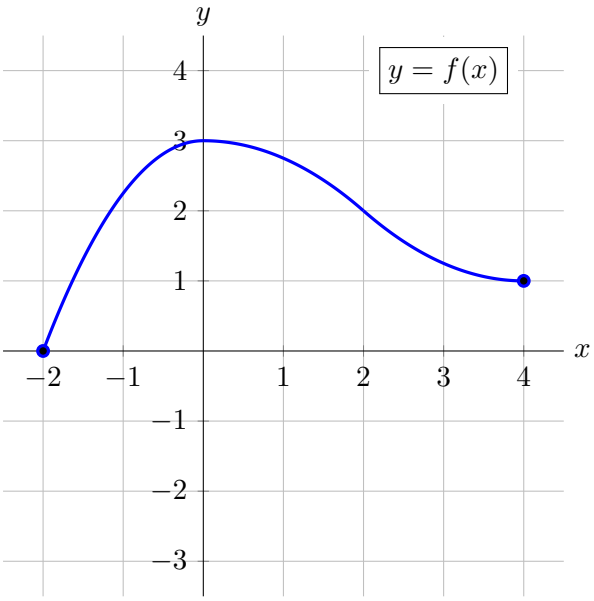
2. [15 points]

a. [6 points] Carefully draw the graph of a single function $y = f(x)$ on the given axes that satisfies all of the given conditions.

A **differentiable** function $f(x)$ with domain containing the interval $(-2, 4)$ such that:

- $f(x)$ is increasing on the interval $(-2, 0)$ and decreasing on the interval $(0, 4)$;
- $f'(x)$ is decreasing on the interval $(-2, 2)$ and increasing on the interval $(2, 4)$;
- $\displaystyle\int_{-2}^{2} f'(t)\,dt = 2.$



b. [9 points] A portion of the graph of the function $g(u)$ is shown below on the left. **Carefully sketch** a continuous antiderivative $G(u)$ of $g(u)$ for $-4 < u < 4$ on the given axes on the right such that $G(0) = 1$.

- **Label the points** (u, y) on your sketch of $G(u)$ with the correct y-value at the u-values $u = -4, -3, -2, -1, 0, 1, 4$.
- Note that $g(u)$ is linear on the intervals $(-4, -2)$, $(-2, -1)$, $(-1, 0)$, and $(0, 1)$, and that the shaded region has area 3.