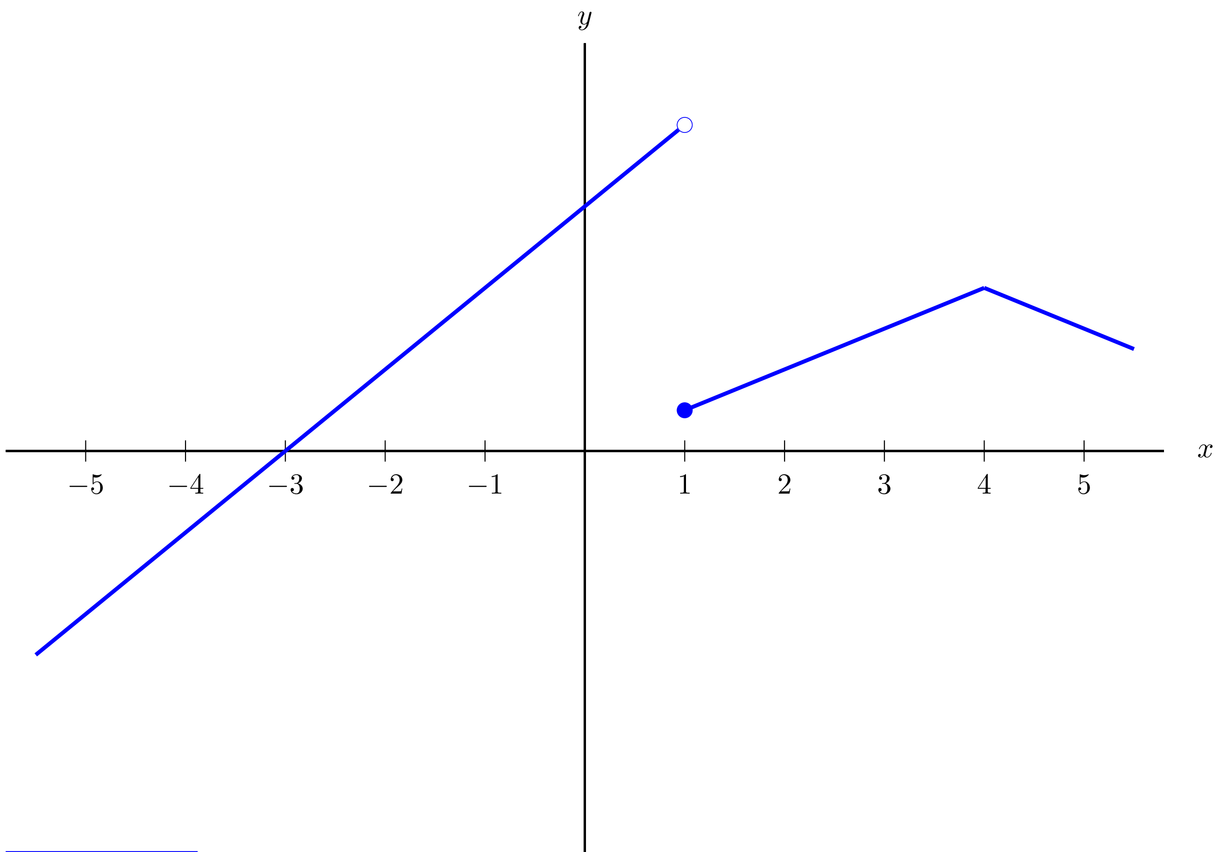
8. [8 points] On the axes provided below, sketch the graph of a single function $y = g(x)$ satisfying all of the following:

- $g(x)$ is defined for all x in the interval $-5 < x < 5$.
- $g'(x) > 0$ for all $x < 0$.
- $g(x)$ has a point of discontinuity at $x = 1$.
- The average rate of change of $g(x)$ between $x = -2$ and $x = 2$ is 0.
- $g(x) > 0$ for all $x > 3$.
- $g'(x) < 0$ for all $x > 4$.

Make sure that your sketch is large and unambiguous.



Solution: Many possibilities exist. Note that in order to satisfy the fourth property, we must have $g(-2) = g(2)$.

9. [3 points] Find all vertical and horizontal asymptotes of the graph of

$$g(x) = \frac{k(x-a)(x-b)}{(x-a)(x-c)^2}$$

where a, b, c, and k are constants with $a < b < c < k$. If there are none, write None.

Horizontal asymptote(s): $y = 0$

Vertical asymptote(s): $x = c$