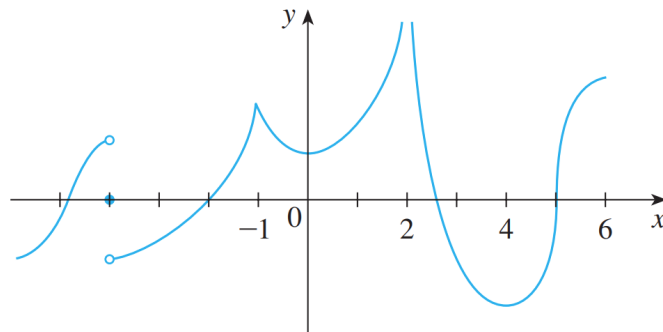


**Exercise 47**

The graph of  $f$  is shown. State, with reasons, the numbers at which  $f$  is not differentiable.

**Solution**

The function is not differentiable at  $x = -4$  because of the jump discontinuity.

$$\lim_{x \rightarrow -4^-} f(x) \neq \lim_{x \rightarrow -4^+} f(x) \neq f(-4)$$

The function is not differentiable at  $x = -1$  because of the kink in the graph.

The function is not differentiable at  $x = 2$  because of the infinite discontinuity.

The function is not differentiable at  $x = 5$  because the slope of the tangent line is undefined; in other words, the graph becomes vertical here.