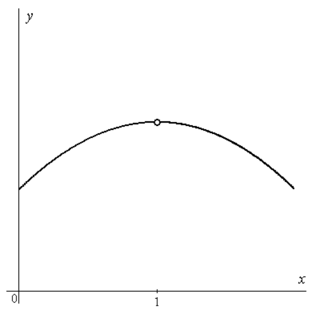
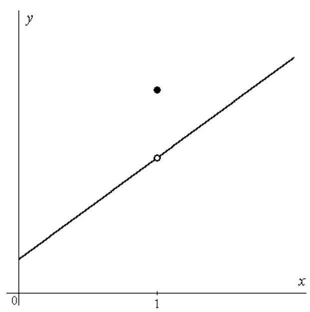
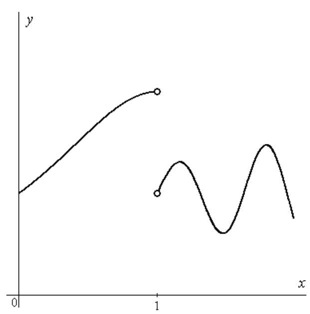
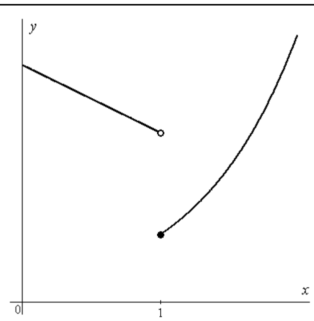
AP Calculus BC Name ________________________

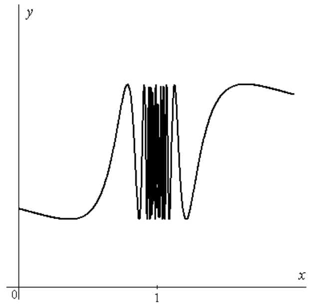
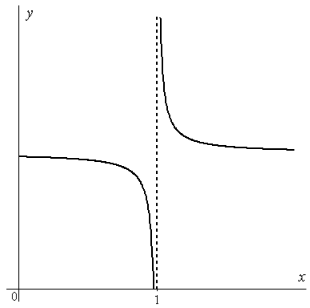
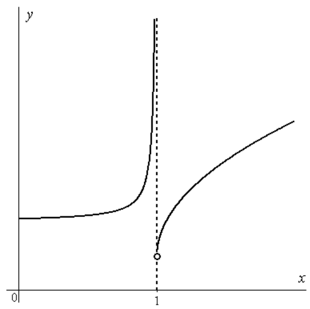
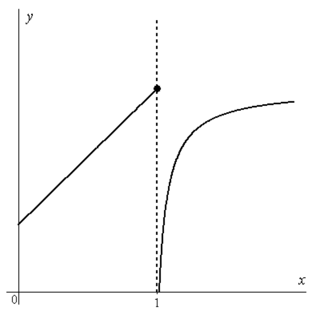
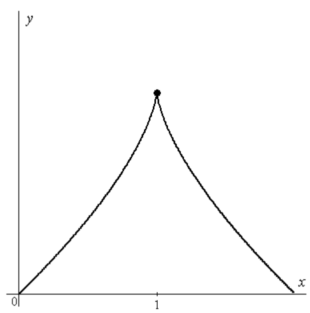
For a function to be *continuous* at a point $x = a$, the three following conditions must be met:

- $f(a)$ is defined
- $\lim_{x \to a} f(x)$ exists
- $f(a) = \lim_{x \to a} f(x)$

For each function shown below, describe the “point of interest” in its graph at $x = 1$. Determine if each function is continuous at $x = 1$. Explain your reasoning based on the three conditions listed in the definition above.

	There is a hole (or “removable discontinuity”) in the graph. $f(x)$ is discontinuous at $x = 1$: • $f(1)$ is undefined
	There is a hole (or “removable discontinuity”) in the graph. $f(x)$ is discontinuous at $x = 1$: • $f(1) \neq \lim_{x \to 1} f(x)$
	There is a jump in the graph. $f(x)$ is discontinuous at $x = 1$: • $f(1)$ is undefined • $\lim_{x \to 1} f(x)$ does not exist (since the one-sided limits are not equal)
	There is a jump in the graph. $f(x)$ is discontinuous at $x = 1$: • $\lim_{x \to 1} f(x)$ does not exist (since the one-sided limits are not equal)

AP Calculus BC Name ________________________

	There is an infinite oscillation in the graph. $f(x)$ is discontinuous at $x = 1$: • $f(1)$ is undefined • $\lim_{x \to 1} f(x)$ does not exist (since there is an infinite oscillation)
	There is a vertical asymptote in the graph. $f(x)$ is discontinuous at $x = 1$: • $f(1)$ is undefined • $\lim_{x \to 1} f(x)$ does not exist (since either one-sided limit is unbounded)
	There is a vertical asymptote in the graph. $f(x)$ is discontinuous at $x = 1$: • $f(1)$ is undefined • $\lim_{x \to 1} f(x)$ does not exist (since the left one-sided limit is unbounded)
	There is a vertical asymptote in the graph. $f(x)$ is discontinuous at $x = 1$: • $\lim_{x \to 1} f(x)$ does not exist (since the right one-sided limit is unbounded)
	There is a "cusp" in the graph. $f(x)$ is continuous at $x = 1$: • $f(1) = \lim_{x \to 1} f(x)$