Section 3.3

**129:15** a.) If $a = -1$, $a = 2$ then $\lim_{x \to a} f(x)$ exists, but $f$ is not continuous at $a$.

b.) If $a = 1$, $a = 3$ then $f$ is continuous at $a$, but not differentiable at $a$ since "corners" are not differentiable.

**129:16** a.) If $a = 0$ then $\lim_{x \to a} f(x)$ exists, but $f$ is not continuous at $a$.

b.) If $a = 1$, $a = 3$ then $f$ is continuous at $a$, but not differentiable at $a$ since "corners" are not differentiable.

**129:17** a.) If $a = 5$ then $\lim_{x \to a} f(x)$ exists, but $f$ is not continuous at $a$.

b.) If $a = 2$, $a = 3$ then $f$ is continuous at $a$, but not differentiable at $a$. There are "corners" at $a = 0$ and $a = 4$. There is a vertical tangent line at $a = 2$.

**129:18** a.) None

b.) If $a = 0$, $a = 2$, $a = 4$ then $f$ is continuous at $a$, but not differentiable at $a$. There are "corners" at $a = 0$ and $a = 4$. There is a vertical tangent line at $a = 2$.

**129:21** a.) $y = \sqrt{x}$

Domain: all $x \geq 0$

$y' = \frac{1}{2} x^{-\frac{1}{2}} = \frac{1}{2 \sqrt{x}}$

b.) $y' = \frac{1}{2x}$

Domain: all $x > 0$
\[ f'(x) \approx 2, 0, -2, -1, 0, 1 \]

\[ f'(2.03) \approx \frac{f(2.05) - f(2.03)}{2.05 - 2.03} = \frac{4.61 - 4.57}{0.02} = 2 \]

\[ f'(3) \approx \frac{f(3.07) - f(3)}{3.07 - 3} \text{ iff } (0.07) + f'(3) = f(3.07) - f(3) \]

\[ (0.07) + f'(3) \approx f(3.07) - 4 \text{ iff } f(3.07) \approx 3.965 \]