In this problem we consider three functions f. The first two are continuous at $x = 0$, i.e., $\lim_{x\to 0} f(x) = f(0)$. The third function is continuous from the right at $x = 0$, i.e., $\lim_{x\to 0^+} f(x) = f(0)$. In order to use the ϵ-δ definition to prove the continuity statements, one must give a definition of δ in terms of ϵ such that

$$0 < |x - 0| < \delta \quad \Longrightarrow \quad |f(x) - f(0)| < \epsilon.$$

To prove the right-continuity statement requires a definition of δ in terms of ϵ such that

$$0 < x - 0 < \delta \quad \Longrightarrow \quad |f(x) - f(0)| < \epsilon.$$

For each function in the list below, enter the number (1,2, or 3) of one of these choices

$$(1) \quad \delta = \epsilon^2; \qquad (2) \quad \delta = \epsilon; \qquad (3) \quad \delta = \sqrt{\epsilon}$$

so that your choices establish continuity of the first two functions, and right-continuity of the third function, at $x = 0$. [You may use each choice only once.]

(a) $f(x) = x$ ______

(b) $f(x) = x^2$ ______

(c) $f(x) = \sqrt{x}$ ______

In this problem we consider three functions f. The first two are continuous at $x = 0$, i.e., $\lim_{x\to 0} f(x) = f(0)$. The third function is continuous from the right at $x = 0$, i.e., $\lim_{x\to 0^+} f(x) = f(0)$. In order to use the ϵ-δ definition to prove the continuity statements, one must give a definition of δ in terms of ϵ such that

$$0 < |x - 0| < \delta \quad \Longrightarrow \quad |f(x) - f(0)| < \epsilon.$$

To prove the right-continuity statement requires a definition of δ in terms of ϵ such that

$$0 < x - 0 < \delta \quad \Longrightarrow \quad |f(x) - f(0)| < \epsilon.$$

For each function in the list below, enter the number (1,2, or 3) of one of these choices

$$(1) \quad \delta = \epsilon^2; \qquad (2) \quad \delta = \epsilon; \qquad (3) \quad \delta = \sqrt{\epsilon}$$

so that your choices establish continuity of the first two functions, and right-continuity of the third function, at $x = 0$. [You may use each choice only once.]

(a) $f(x) = x$ (2)

(b) $f(x) = x^2$ (3)

(c) $f(x) = \sqrt{x}$ (1)