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1. Suppose that $\lim_{x \rightarrow 3} f(x) = 5$ and $\lim_{x \rightarrow 3} g(x) = 4$.
- (a) Find $\lim_{x \rightarrow 3} 3f(x) - 2g(x)$.
- (b) Find $\lim_{x \rightarrow 3} \frac{f(x) - 5}{g(x)}$.
2. Give examples to show that it is possible to have $\lim_{x \rightarrow 3} f(x) = 0 = \lim_{x \rightarrow 3} g(x)$ and
- (a) $\lim_{x \rightarrow 3} \frac{f(x)}{g(x)} = 3$.
- (b) $\lim_{x \rightarrow 3} \frac{f(x)}{g(x)} = 0$.
- (c) $\lim_{x \rightarrow 3} \frac{f(x)}{g(x)} = \infty$.

1. (a) $\lim_{x \rightarrow 3} 3f(x) - 2g(x) = 3(5) - 2(4) = 7$

(b) $\lim_{x \rightarrow 3} \frac{f(x) - 5}{g(x)} = \frac{5 - 5}{4} = 0$ (since $4 \neq 0$, this is valid.)

2. (a) $\lim_{x \rightarrow 3} \frac{3(x-3)}{x-3} = 3$

(b) $\lim_{x \rightarrow 3} \frac{(x-3)^2}{x-3} = 0$

(c) $\lim_{x \rightarrow 3} \frac{x-3}{(x-3)^3} = \lim_{x \rightarrow 3} \frac{1}{(x-3)^2} = \infty$

For #2 there are infinitely many possible answers to each (a) - (c).