

Name _____ Date _____ Period _____

Worksheet 1.2—Properties of Limits

Show all work. Unless stated otherwise, no calculator permitted.

Short Answer

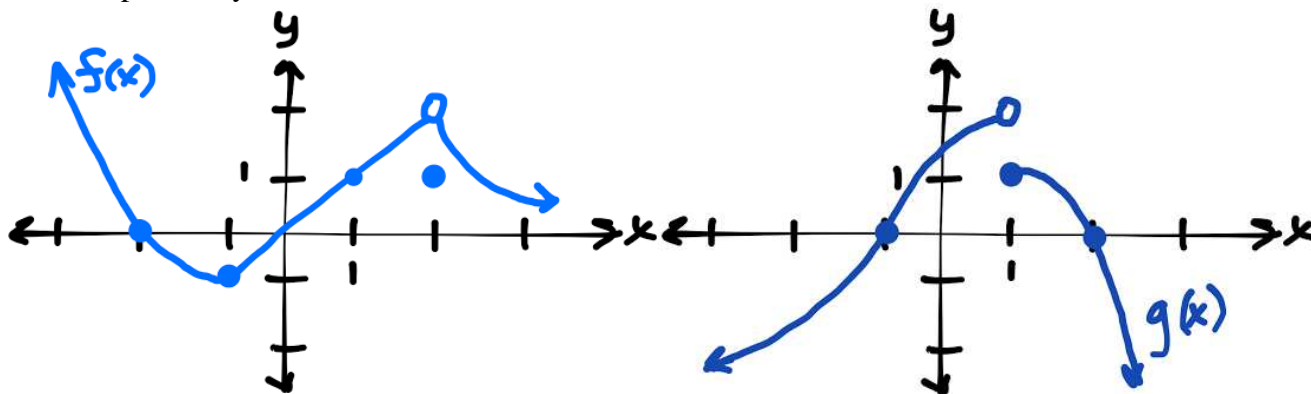
1. Given that $\lim_{x \rightarrow a} f(x) = -3$, $\lim_{x \rightarrow a} g(x) = 0$, $\lim_{x \rightarrow a} h(x) = 8$, for some constant a , find the limits that exist.

If the limit does not exist, explain why.

(a) $\lim_{x \rightarrow a} [f(x) + h(x)] =$ (b) $\lim_{x \rightarrow a} [f(x)]^2 =$ (c) $\lim_{x \rightarrow a} \sqrt[3]{h(x)} =$ (d) $\lim_{x \rightarrow a} \frac{1}{f(x)} =$

(e) $\lim_{x \rightarrow a} \frac{f(x)}{h(x)} =$ (f) $\lim_{x \rightarrow a} \frac{g(x)}{f(x)} =$ (g) $\lim_{x \rightarrow a} \frac{f(x)}{g(x)} =$ (h) $\lim_{x \rightarrow a} \frac{2f(x)}{h(x) - f(x)} =$

2. The graphs of f and g are given below. Use them to evaluate each limit, if it exists. If the limit does not exist, explain why.



(a) $\lim_{x \rightarrow 2^-} [f(x) + g(x)] =$

(b) $\lim_{x \rightarrow 1} [2f(x) - 3g(x)] =$

(c) $\lim_{x \rightarrow 0} [f(x)g(x)] =$

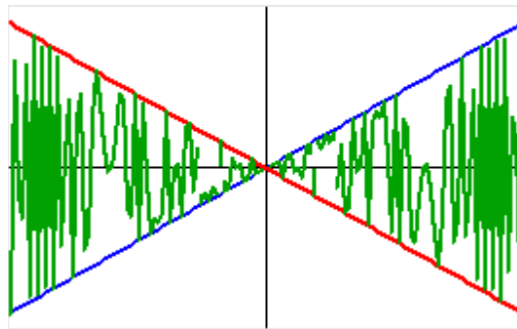
(d) $\lim_{x \rightarrow -1} \frac{f(x)}{g(x)} =$

(e) $\lim_{x \rightarrow 2} x^3 f(x) =$

(f) $\lim_{x \rightarrow 1^-} f(g(x)) =$

3. The graphs of the functions $f(x) = x$, $g(x) = -x$, and $h(x) = x \cos\left(\frac{50\pi}{x}\right)$ on the interval $-1 \leq x \leq 1$ are given at right.

Use the Squeeze Theorem to find $\lim_{x \rightarrow 0} x \cos\left(\frac{50\pi}{x}\right)$. Justify.



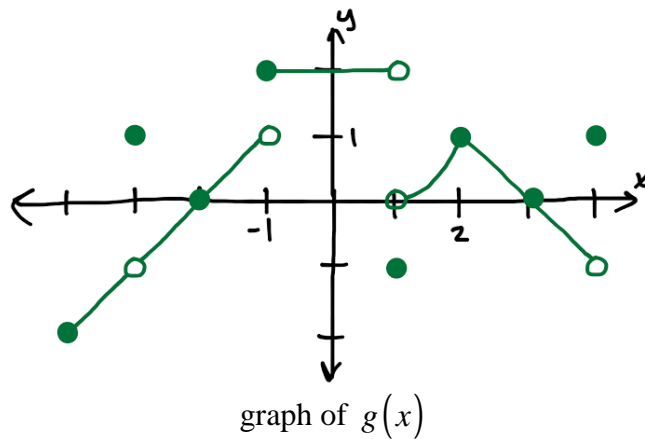
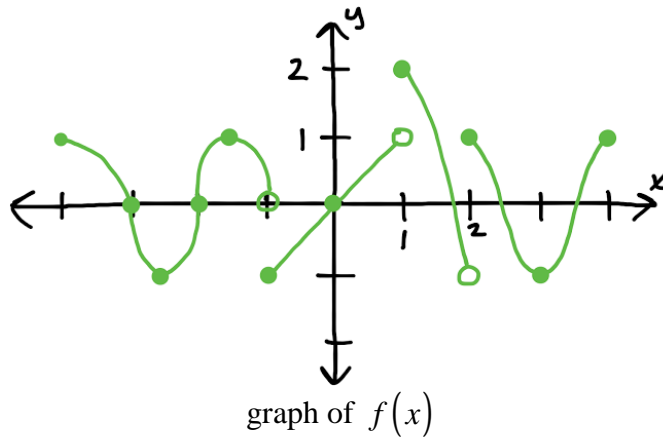
4. If $1 \leq f(x) \leq x^2 + 2x + 2$ for all x , find $\lim_{x \rightarrow -1} f(x)$. Justify.

5. If $-3\cos(\pi x) \leq f(x) \leq x^3 + 2$, evaluate $\lim_{x \rightarrow 1} f(x)$. Justify

Multiple Choice

_____ 6. Suppose $2 \leq f(x) \leq (1-x)^2 + 2$ for all $x \neq 1$ and that $f(1)$ is undefined. What is $\lim_{x \rightarrow 1} f(x)$?

- (A) 3 (B) 2 (C) 4 (D) $\frac{5}{2}$ (E) 1



Use the graphs of the function $f(x)$ and $g(x)$ shown above to answer questions 7 – 9.

_____ 7. $\lim_{x \rightarrow 2^-} \left(\frac{f(x)}{g(x)} \right) =$

- (A) 1 (B) -1 (C) 2 (D) -2 (E) DNE

_____ 8. $\lim_{x \rightarrow -3^-} f(g(x)) =$

- (A) 0 (B) -1 (C) 2 (D) 1 (E) DNE

_____ 9. $g(1) + \lim_{x \rightarrow -1^+} x \cdot f(x) =$

- (A) 0 (B) -1 (C) 2 (D) 1 (E) DNE