

Evaluating a Limit Using Limit Laws

Limits, Cont., & R.O.C Day 4

Given that: $\lim_{x \rightarrow 2} f(x) = 4$ $\lim_{x \rightarrow 2} g(x) = -2$ $\lim_{x \rightarrow 2} h(x) = 0$

Find the limits that exist. If the limit does not exist, explain why.

A.) $\lim_{x \rightarrow 2} [f(x) + 5g(x)]$

$= -6$

B.) $\lim_{x \rightarrow 2} [g(x)]^3$

$= -8$

C.) $\lim_{x \rightarrow 2} \sqrt{f(x)}$

$= 2$

D.) $\lim_{x \rightarrow 2} \frac{3f(x)}{g(x)}$

$= -6$

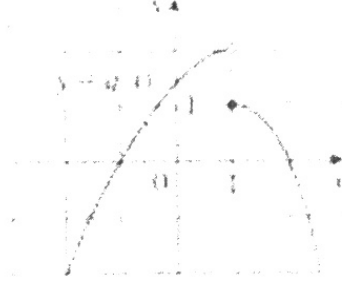
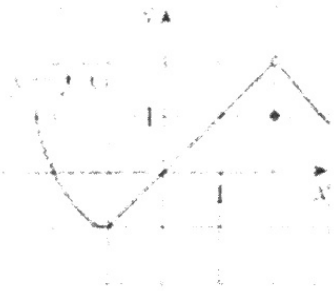
E.) $\lim_{x \rightarrow 2} \frac{g(x)}{h(x)}$

$= -\frac{2}{0}$ DNE

F.) $\lim_{x \rightarrow 2} \frac{g(x)h(x)}{f(x)}$

$= 0$

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



A.) $\lim_{x \rightarrow 2} [f(x) + g(x)]$

$= 2$

B.) $\lim_{x \rightarrow 1} [f(x) + g(x)]$

$= \text{DNE}$

C.) $\lim_{x \rightarrow 0} [f(x)g(x)]$

$= 0$

D.) $\lim_{x \rightarrow -1} \frac{f(x)}{g(x)}$

$= -\frac{1}{0}$ DNE

E.) $\lim_{x \rightarrow 2} [x^3 f(x)]$

$= 16$

B.) $\lim_{x \rightarrow 1} \sqrt{3 + f(x)}$

$= 2$

3-18: Evaluate the limit, if it exists.

3. $\lim_{x \rightarrow 5} \frac{x^2 - 6x + 5}{x - 5} = 4$

4. $\lim_{x \rightarrow 4} \frac{x^2 - 4x}{x^2 - 3x - 4} = \frac{4}{5}$

5. $\lim_{x \rightarrow 5} \frac{x^2 - 5x + 6}{x - 5} = \frac{6}{0}$ DNE

6. $\lim_{x \rightarrow -1} \frac{x^2 - 4x}{x^2 - 3x - 4} = -\frac{1}{0}$ DNE

7. $\lim_{t \rightarrow -3} \frac{t^2 - 9}{2t^2 + 7t + 3} = \frac{6}{5}$

8. $\lim_{x \rightarrow -1} \frac{2x^2 + 3x + 1}{x^2 - 2x - 3} = \frac{1}{4}$

Finding a Limit Using Limit Laws

$$9. \lim_{h \rightarrow 0} \frac{(-5+h)^2 - 25}{h} = -10$$

$$10. \lim_{h \rightarrow 0} \frac{(2+h)^3 - 8}{h} = 12$$

$$11. \lim_{x \rightarrow -2} \frac{x+2}{x^3+8} = \frac{1}{12}$$

$$12. \lim_{t \rightarrow 1} \frac{t^4-1}{t^3-1} = \frac{4}{3}$$

$$13. \lim_{h \rightarrow 0} \frac{\sqrt{9+h}-3}{h} = \frac{1}{6}$$

$$14. \lim_{u \rightarrow 2} \frac{\sqrt{4u+1}-3}{u-2} = \frac{2}{3}$$

$$15. \lim_{x \rightarrow -4} \frac{\frac{1}{4-x}}{4+x} = -\frac{1}{16}$$

$$16. \lim_{h \rightarrow 0} \frac{\frac{1}{3+h} - \frac{1}{3}}{h} = -\frac{1}{9}$$

$$17. \lim_{t \rightarrow 0} \frac{\sqrt{1+t} - \sqrt{1-t}}{t} = 1$$

$$18. \lim_{x \rightarrow -4} \frac{\sqrt{x^2+9}-5}{x+4} = -\frac{4}{5}$$

19. If $4x - 9 \leq f(x) \leq x^2 - 4x + 7$ for $x \geq 0$, find $\lim_{x \rightarrow 4} f(x)$.

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20. If $2x \leq g(x) \leq x^4 - x^2 + 2$ for all x , evaluate $\lim_{x \rightarrow 1} g(x)$.

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