Warm Up

Evaluate the following limits, if they exist:

1. $\lim\limits_{x\to 2}\dfrac{x-2}{x^3-8}$

$$\lim_{x\to 2}\frac{(x-2)}{(x-2)(x^2+2x+4)}$$

$$\lim_{x\to 2}\frac{1}{4+4+4}=\boxed{\frac{1}{12}}$$

2. $\lim\limits_{x\to 7}\dfrac{\left(\sqrt{x+2}-3\right)\left(\sqrt{x+2}+3\right)}{(x-7)\left(\sqrt{x+2}+3\right)}$

$$\lim_{x\to 7}\frac{((x+2)-9)}{(x-7)\left(\sqrt{x+2}+3\right)}$$

$$\lim_{x\to 7}\frac{(x-7)}{(x-7)\left(\sqrt{x+2}+3\right)}$$

$$\lim_{x\to 7}\frac{1}{3+3}=\boxed{\frac{1}{6}}$$

3. $\lim\limits_{h\to 0}\dfrac{(a+h)^2-a^2}{h}$

$$\lim_{h\to 0}\frac{(a+h-a)(a+h+a)}{h}$$

$$\lim_{h\to 0}\frac{(h)(2a+h)}{h}=\boxed{2a}$$

Questions from Homework

③ j) $\lim_{t\to 3}\left(2t^2+\sqrt{\frac{6+t}{4-t}}\right)$

$\lim_{t\to 3}\left(2(3)^2+\sqrt{\frac{6+3}{4-3}}\right)$

$\lim_{t\to 3}\left(2(9)+\sqrt{\frac{9}{1}}\right) = 18+3 = \boxed{21}$

④ h) $\lim_{x\to 2}\dfrac{2x\ \frac{1}{x}-\frac{1}{2}\ 2x}{(x-2)(2x)}$

$\lim_{x\to 2}\dfrac{\overset{-1}{(2-x)}}{2x(x-2)} = \boxed{\dfrac{-1}{4}}$

⑤ a) $\lim_{h\to 0}\dfrac{(4+h)^3-64}{h}$

$\lim_{h\to 0}\dfrac{((4+h)-4)((4+h)^2+4(4+h)+16)}{h}$

$\lim_{h\to 0}\dfrac{h((4+h)^2+4(4+h)+16)}{h}$

$= 16+16+16$

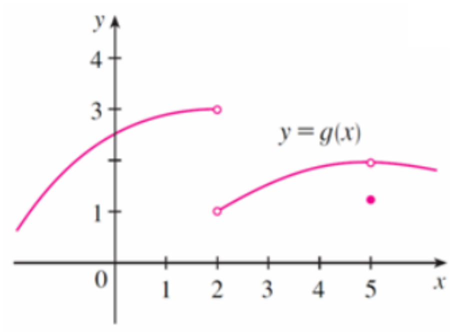
$\boxed{=48}$

The common sense definition of a limit...

When does a limit exist?

One-sided limits

Use the graph shown below to evaluate the following limits:



1. $\lim_{x\to 2^-} g(x) =$ ☐ "as x approaches 2 from the left"

2. $\lim_{x\to 2^+} g(x) =$ ☐ "as x approaches 2 from the right"

3. $\lim_{x\to 2} g(x) =$ ☐

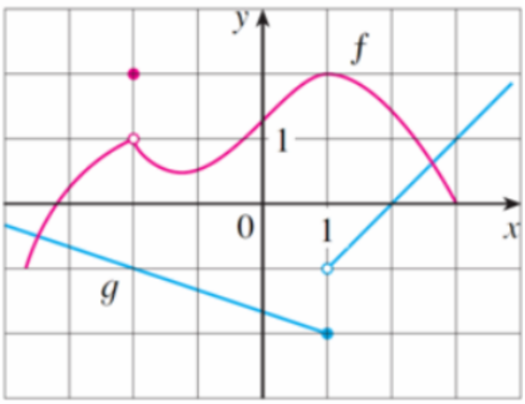
4. $\lim_{x\to 5^-} g(x) =$ ☐

5. $\lim_{x\to 5^+} g(x) =$ ☐

6. $\lim_{x\to 5} g(x) =$ ☐

Notice... $g(5) =$

Example:



Evaluate each of the following:

$f(-2) =$ $\qquad$ $\lim_{x\to 1^-} g(x) =$ $\qquad$ $g(1) =$

$\lim_{x\to 1^+} g(x) =$ $\qquad$ $\lim_{x\to 1} g(x) =$ $\qquad$ $\lim_{x\to 1} f(x) =$

$\lim_{x\to -2} f(x) =$

Homework

Page 27

1, 2, 3