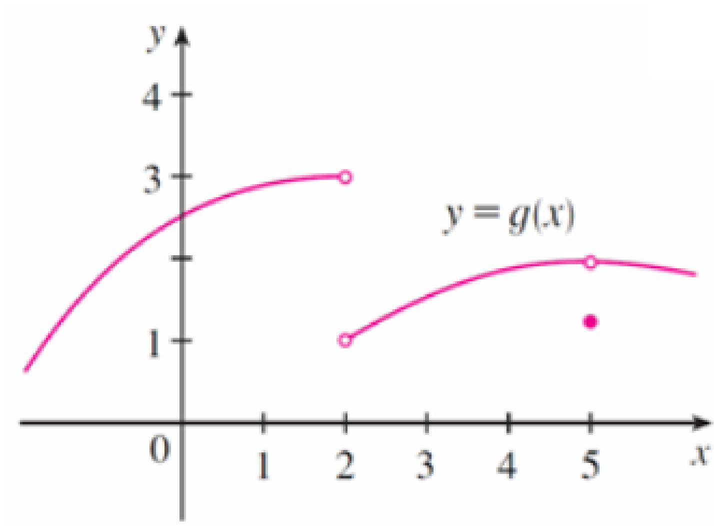
Use the graph shown below to evaluate the following limits:



Notice... $g(5) = 1.2$

closed dot
(defined height)

1. $\lim\limits_{x \to 2^-} g(x) = \boxed{3}$ "as x approaches 2 from the left"

2. $\lim\limits_{x \to 2^+} g(x) = \boxed{1}$ "as x approaches 2 from the right"

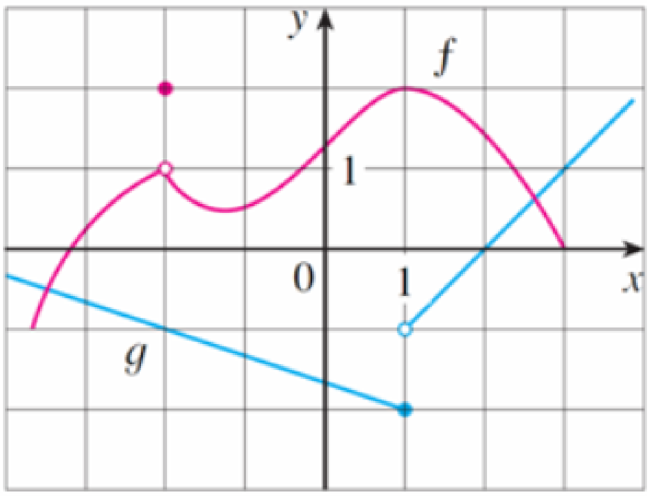
3. $\lim\limits_{x \to 2} g(x) = \boxed{\text{DNE}}$

4. $\lim\limits_{x \to 5^-} g(x) = \boxed{2}$

5. $\lim\limits_{x \to 5^+} g(x) = \boxed{2}$

6. $\lim\limits_{x \to 5} g(x) = \boxed{2}$

Example:



$f(-2) = 2$

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

$g(1) = -2$

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

$\lim_{x \to 1} g(x) =$ DNE

$\lim_{x \to 1} f(x) = 2$

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

Calculate the following limits!

$$\lim_{x\to\infty}\frac{(2-3x^2)^2}{(2x^2+1)(3x^2-5)}$$

$(2-3x^2)(2-3x^2)$

$$\lim_{x\to\infty}\frac{4-12x^2+9x^4}{6x^4-7x^2-5}=\frac{9}{6}=\frac{3}{2}$$

$$\lim_{x\to 2}\frac{\sqrt{x}-\sqrt{2}}{x^4-16}\cdot\frac{(\sqrt{x}+\sqrt{2})}{(\sqrt{x}+\sqrt{2})}$$

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

$$\lim_{x\to 2}\frac{\cancel{(x-2)}}{\cancel{(x-2)}(x+2)(x^2+4)(\sqrt{x}+\sqrt{2})}=\frac{1}{(4)(8)(2\sqrt{2})}=\frac{1}{64\sqrt{2}}=\frac{\sqrt{2}}{128}$$

$$\lim_{x\to 0}\frac{x^2+3x}{(x+2)^2-(x-2)^2}$$

x^2-49

$(x-7)(x+7)$

$$\lim_{x\to 0}\frac{x(x+3)}{[(x+2)-(x-2)][(x+2)+(x-2)]}$$

$$\lim_{x\to 0}\frac{x(x+3)}{[x+2-x+2][x+2+x-2]}$$

$$\lim_{x\to 0}\frac{x(x+3)}{4(2x)}$$

$$\lim_{x\to 0}\frac{\cancel{x}(x+3)}{8\cancel{x}}=\frac{3}{8}$$

$$\lim_{a\to b}\frac{(a+2b)^2-9b^2}{a-b}$$

$$\lim_{a\to b}\frac{\overbrace{[(a+2b)-3b]}^{a+2b-3b}\overbrace{[(a+2b)+3b]}^{a+2b+3b}}{a-b}$$

$$\lim_{a\to b}\frac{\cancel{(a-b)}(a+5b)}{\cancel{(a-b)}}=6b$$

Given the function $f(x) = \begin{cases} 3 - x, & \text{if } x < -1 \\ 4, & \text{if } -1 \le x < 2 \\ 1, & \text{if } x = 2 \\ 8 - x^2, & \text{if } x > 2 \end{cases}$

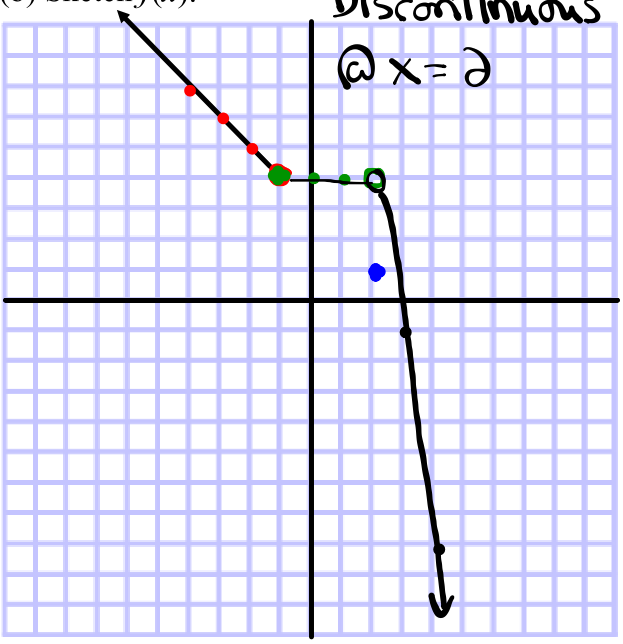
$>, <$ (open)

$\geq, \leq, =$ (closed)

(a) Check $f(x)$ for any points of discontinuity. Provide a mathematical reason to validate any point(s) where the function is discontinuous.

(b) Sketch $f(x)$.

Discontinuous @ $x = 2$



$\lim_{x \to 2} f(x) \neq f(2)$

$4 \neq 1$

$3 - x$

	x	$f(x)$
∘	−1	4
•	−2	5
•	−3	6
•	−4	7

4

	x	$f(x)$
•	−1	4
•	0	4
•	1	4
∘	2	4

1

	x	$f(x)$
•	2	1

$8 - x^2$

	x	$f(x)$
∘	2	4
•	3	−1
•	4	−8