Topic: 1.9 Connecting Multiple Representations of Limits

Answer each of the following problems in this Four Corner Activity.

$f(x) = x^2 - 3x - 28$

$g(x) = x + 4$

$h(x) = -2|x+4|$

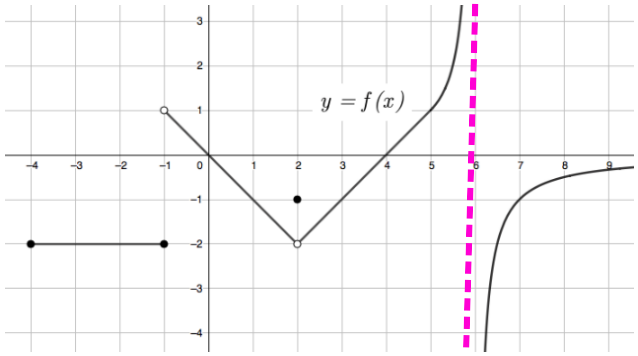
(-4,0)

Use the functions above to evaluate the following limits. If a limit does not exist, write "dne."

1. $\lim_{x\to -4} \frac{f(x)}{g(x)}$ $= \lim_{x\to -4} \frac{(x+4)(x-7)}{x+4} = -4-7 = -11$

2. $\lim_{x\to 7} \frac{g(x)}{f(x)}$ $= \lim_{x\to 7} \frac{x+4}{(x+4)(x-7)} = \lim_{x\to 7} \frac{1}{x-7} = \infty$ or $-\infty$ $\therefore$ limit dne

3. $\lim_{x\to -4^+} \frac{g(x)}{h(x)}$ $= \lim_{x\to -4^+} \frac{x+4}{-2|x+4|} = \lim_{x\to -4^+} \frac{1}{-2} = -\frac{1}{2}$



The graph of $f(x)$, shown above, has a vertical asymptote at $x = 6$. Use the graph to evaluate the following limits. If a limit does not exist, write dne.

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

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

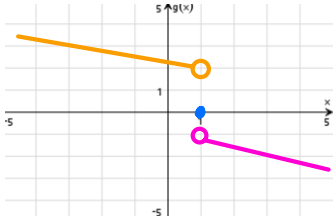
3. $\lim_{x\to -1^-} f(x) = -2$

4. $\lim_{x\to 6} f(x)$ dne

Topic: Limits

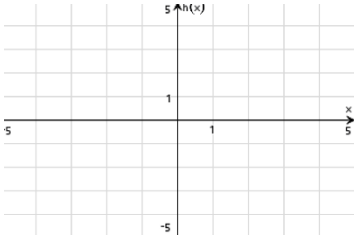
Sketch a graph that meets the following guidelines.

1. $\lim_{x\to 1^-} g(x) = 2$, $\lim_{x\to 1^+} g(x) = -1$, $g(1) = 0$



2. $\lim_{x\to 2^-} h(x) = -\infty$, $\lim_{x\to 2^+} h(x) = +\infty$

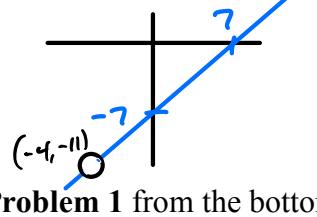
$\lim_{x\to -\infty} h(x) = 2$, $\lim_{x\to \infty} h(x) = -2$



1. Which limit from the upper right corner does not exist for the same reason as **Problem 2** on the upper left corner?

#4

2. Sketch a graph of the limit described in the first problem from the top left corner.



3. Using **Problem 1** from the bottom left corner, explain the difference between finding $g(1)$ and $\lim_{x\to 1} g(x)$.

- $g(1)$ is finding the y-value when $x = 1$
- $\lim_{x\to 1} g(x)$ is finding what y approaches as x approaches 1