

Answers only.

We put table of values on the board on Fri.

2-2 EXAMPLES: CALCULATING LIMITS

1. Use your calculator and a table of values to determine the value of the following limits or state that the limits do not exist.

$$(a) \lim_{x \rightarrow 0} \frac{e^{2x} - 1}{x} = 2$$

$$(b) \lim_{x \rightarrow 3} \frac{4}{(x-3)^2} = +\infty$$

$$(c) \lim_{x \rightarrow 1^-} \ln(x-1) = -\infty$$

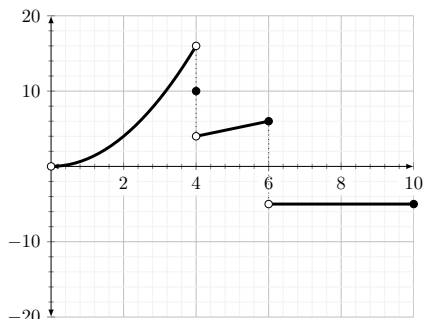
$$(d) \text{ Assume } f(x) = \begin{cases} x+1 & x < 0 \\ x-1 & 0 \leq x < 2 \\ 1 + \sqrt{x-2} & 2 < x \end{cases}$$

$$i. \lim_{x \rightarrow 0} f(x) = \text{DNE}$$

$$\lim_{x \rightarrow 0^+} x-1 = -1 \quad \text{and} \quad \lim_{x \rightarrow 0^-} x+1 = 1$$

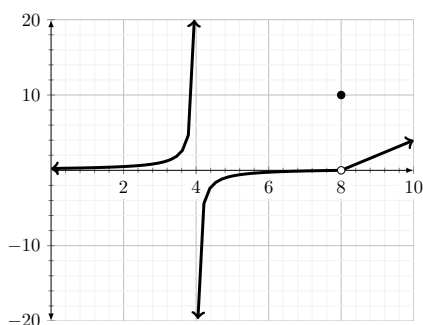
$$ii. \lim_{x \rightarrow 2} f(x) = 1$$

2. The function $g(x)$ is graphed below. Use the graph to fill in the blanks.



- (a) $\lim_{x \rightarrow 4^-} f(x) = \underline{16}$
 (b) $\lim_{x \rightarrow 4^+} f(x) = \underline{4}$
 (c) $\lim_{x \rightarrow 4} f(x) = \underline{DNE}$
 (d) $f(4) = \underline{10}$
 (e) $\lim_{x \rightarrow 8} f(x) = \underline{5}$
 (f) $f(8) = \underline{5}$

3. The function $g(x)$ is graphed below. Use the graph to fill in the blanks.



- (a) $\lim_{x \rightarrow 4^-} f(x) = \underline{+\infty}$
 (b) $\lim_{x \rightarrow 4^+} f(x) = \underline{-\infty}$
 (c) $\lim_{x \rightarrow 4} f(x) = \underline{DNE}$
 (d) $f(4) = \underline{DNE}$
 (e) $\lim_{x \rightarrow 8} f(x) = \underline{0}$
 (f) $f(8) = \underline{10}$

Write the equation of any vertical asymptotes:

4. Determine the limit. Explain your answer.

(a) $\lim_{x \rightarrow 5^+} \frac{2+x}{x-5} = +\infty$

As $x \rightarrow 5^+$, $2+x \rightarrow 7$ and $x-5 \rightarrow 0$ but is always positive.

(b) $\lim_{x \rightarrow 5^+} \frac{2+x}{5-x} = -\infty$

As $x \rightarrow 5^+$, $2+x \rightarrow 7$ but $5-x \rightarrow 0^-$ since $5-x$ is always negative.

(c) $\lim_{x \rightarrow (\pi/2)^+} \frac{e^x}{\sin x} = \frac{e^{\pi/2}}{\sin(\pi/2)} = \frac{e^{\pi/2}}{1} = e^{\pi/2}$