Q1: The graph of \( y = f(x) \) is a global graph (i.e. all interesting behavior and the end behavior is shown).

1. The two grey lines are not part of the graph, but they are asymptotes for the graph. What are their equations?
   
   vertical \( x = 1 \)  
   horizontal \( y = 2 \)

2. Evaluate the limits using \(-\infty\) or \(+\infty\) instead of "dne"
   
   \[ \lim_{{x \to -\infty}} f(x) = \frac{2}{-} \]
   
   as \( x \to -\infty \), the graph approaches the horizontal asymptote \( y = 2 \)

   \[ \lim_{{x \to +1^+}} f(x) = +\infty \]
   
   as \( x \to 1^+ \) the graph is increasing w/o bound

Q2: Evaluate the limits using \(-\infty\) or \(+\infty\) instead of "does not exist" where appropriate.

A. \( \lim_{{x \to \infty}} \frac{-3}{x} = 0 \)

B. \( \lim_{{x \to 0^+}} \frac{-3}{x} = -\infty \)

C. \( \lim_{{x \to +\infty}} 3x^2 - 4x^3 + 1 = -\infty \)
   
   dominate by \(-4x^3\) which is negative for positive \( x \) values

D. \( \lim_{{x \to +\infty}} \frac{-3x^2 + 2x^3}{x^4 - 8} = 0 \)
   
   determine by \(-3x^2/x^4 = -3/x^2\)
   
   as \( x \to +\infty \), \(-3/x^2 \to 0\)

Q3: The graph of the equation

\[ f(x) = \frac{3x + 5}{x + 2} \]

has vertical asymptote \( x = -2 \) and horizontal asymptote \( y = 3 \)

Where denominator \( \to 0 \): \( x + 2 = 0 \)

\[ x = -2 \]

\[ \lim_{{x \to -2}} \frac{3x + 5}{x + 2} = \lim_{{x \to 0}} \frac{3x}{x} = \lim_{{x \to 0}} 3 = 3 \]
Q1:  The graph of \( y = f(x) \) is a global graph (i.e. all interesting behavior and the end behavior is shown).

1. The two grey lines are not part of the graph, but they are asymptotes for the graph. What are their equations?
   - vertical  \( x=1 \)
   - horizontal  \( y=2 \)

2. Evaluate the limits using \( -\infty \) or \( +\infty \) instead of "dne"

   \[
   \lim_{x\to+\infty} f(x) = \frac{-5}{100} = \frac{-5}{100} = -0.05
   \]
   \[
   \lim_{x\to-1} f(x) = \frac{-5}{0.01} = \frac{-500}{0.01} = -50,000
   \]

Q2:  Evaluate the limits using \( -\infty \) or \( +\infty \) instead of "does not exist" where appropriate.

A. \( \lim_{x\to\infty} \frac{-5}{x} = \frac{-5}{100} = -0.05 \)

B. \( \lim_{x\to0^+} \frac{-5}{x} = -\infty \)

C. \( \lim_{x\to+\infty} 3x^2 - 4x^4 + 1 = -\infty \)

D. \( \lim_{x\to+\infty} \frac{-3x^2 + 2x}{x^4 - 8} = 0 \)

Q3:  The graph of the equation

\[
f(x) = \frac{5x + 3}{x - 2}
\]

has vertical asymptote  \( x=2 \) equation and horizontal asymptote  \( y=5 \) equation.

Where the denominator \( x-2 = 0 \), \( x = 2 \)

\[
\lim_{x\to0} \frac{5x+3}{x-2} = \lim_{x\to0} \frac{5x}{x} \]  

\[= \lim_{x\to0} 5 \]

\[= 5 \]
Q1: The graph of $y = f(x)$ is a global graph (i.e. all interesting behavior and the end behavior is shown).

1. The two grey lines are not part of the graph, but they are asymptotes for the graph. What are their equations?

   vertical _______   horizontal _______

2. Evaluate the limits using $-\infty$ or $+\infty$ instead of "dne"

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

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

Q2: Evaluate the limits using $-\infty$ or $+\infty$ instead of "does not exist" where appropriate.

A. $\lim_{x \to \infty} \frac{-3}{x} = _____$

B. $\lim_{x \to 0^+} \frac{-3}{x} = _____$

C. $\lim_{x \to +\infty} 3x^2 - 4x^3 + 1 = _____$

D. $\lim_{x \to +\infty} \frac{-3x^2 + 2x^3}{x^4 - 8} = _____$

Q3: The graph of the equation

$$f(x) = \frac{3x + 5}{x + 2}$$

has vertical asymptote _______ and horizontal asymptote _______
Q1: The graph of \( y = f(x) \) is a global graph (i.e. all interesting behavior and the end behavior is shown).

1. The two grey lines are not part of the graph, but they are asymptotes for the graph. What are their equations?
   
   \[ \text{vertical } \quad \text{horizontal } \quad \]

2. Evaluate the limits using \(-\infty\) or \(+\infty\) instead of "dne"

   \[ \lim_{x \to +\infty} f(x) = \quad \]
   \[ \lim_{x \to 1} f(x) = \quad \]

Q2: Evaluate the limits using \(-\infty\) or \(+\infty\) instead of "does not exist" where appropriate.

   \[ A. \lim_{x \to -\infty} \frac{-5}{x} = \quad \]
   \[ B. \lim_{x \to 0^+} \frac{-5}{x} = \quad \]
   \[ C. \lim_{x \to +\infty} 3x^2 - 4x^4 + 1 = \quad \]
   \[ D. \lim_{x \to +\infty} \frac{-3x^2 + 2x}{x^4 - 8} = \quad \]

Q3: The graph of the equation

\[ f(x) = \frac{5x + 3}{x - 2} \]

has vertical asymptote \[ \quad \] and horizontal asymptote \[ \quad \]