

General Instructions: If there is any work to show, show it!

1. Evaluate the following limits. If any intermediate steps or work in necessary, show it. Do not just use a calculator on these limits, use an algebraic approach for any indeterminate forms.

$$a) \lim_{x \rightarrow 5} \frac{10}{x} = \frac{10}{5}$$

$$= \textcircled{2}$$

$$b) \lim_{x \rightarrow 1} \frac{x^2 - x - 6}{x - 3}$$

$$= \frac{1^2 - 1 - 6}{1 - 3} = \frac{1 - 1 - 6}{-2}$$

$$= \frac{-6}{-2}$$

$$= \textcircled{3}$$

$$c) \lim_{x \rightarrow 3} \frac{x^2 - x + 6}{(x - 3)}$$

$$= \lim_{x \rightarrow 3} x + 2$$

$$= 3 + 2$$

$$= \textcircled{5}$$

2. Evaluate the following limits. If any intermediate steps or work in necessary, show it. Do not just use a calculator on these limits, use an algebraic approach for any indeterminate forms.

$$a) \lim_{x \rightarrow 5} \frac{x^2 - 36}{x - 6}$$

$$= \frac{5^2 - 36}{5 - 6}$$

$$= \frac{25 - 36}{-1}$$

$$= \frac{-11}{-1}$$

$$= \textcircled{11}$$

$$b) \lim_{x \rightarrow 4} \frac{x^2 - 16}{(x - 4)}$$

$$= \lim_{x \rightarrow 4} x + 4$$

$$= 4 + 4$$

$$= \textcircled{8}$$

$$c) \lim_{x \rightarrow -3} \frac{2x^2 + x - 15}{(x + 3)}$$

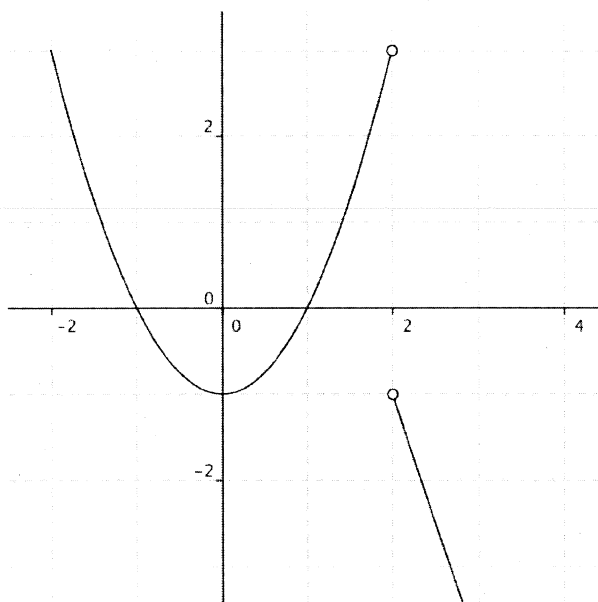
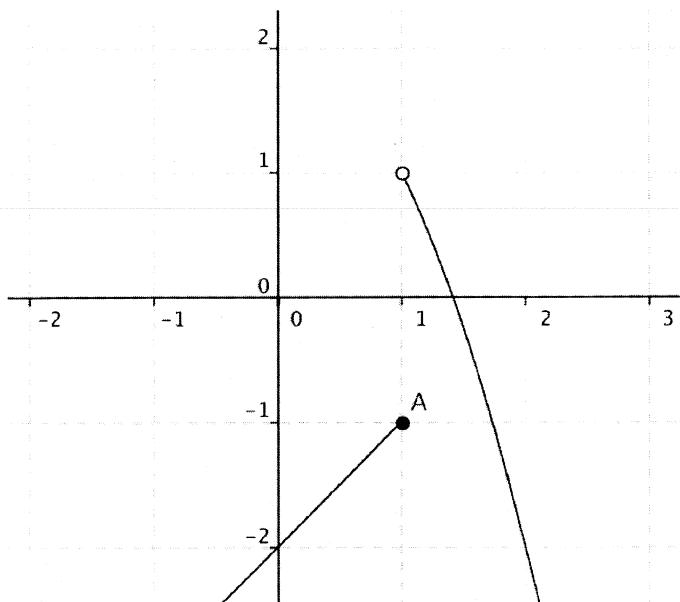
$$= \lim_{x \rightarrow -3} 2x - 5$$

$$= 2(-3) - 5$$

$$= -6 - 5$$

$$= \textcircled{-11}$$

3. For each piecewise function graphed below, evaluate each limit or functional value. $f(x)$ is the function on the left and $g(x)$ is the function on the right.



a) $\lim_{x \rightarrow 1^+} f(x) = 1$

c) $\lim_{x \rightarrow 2^-} g(x) = 3$

b) $f(1) = -1$

d) $\lim_{x \rightarrow 2} g(x) = \text{DNE}$
*(because $\lim_{x \rightarrow 2^+} \neq \lim_{x \rightarrow 2^-}$
 $-1 \neq 3$)*

4. Evaluate the following limits. If any intermediate steps or work in necessary, show it. Use a calculator on this problem to fill out the x-y chart below. Use the data from the table below to estimate what you think the limit of the function is.

Let $f(x) = \frac{x^3 - 4x^2 + x + 6}{x - 3}$, $\lim_{x \rightarrow 3} f(x) = 4$

x	f(x)
1	-2
2	0
2.9	3.5100
2.99	3.9501
3.01	4.0501
3.1	4.51
4	10
5	18

General Instructions: If there is any work to show, show it!

1. Evaluate the following limits. If any intermediate steps or work in necessary, show it. Do not just use a calculator on these limits, use an algebraic approach for any indeterminate forms.

$$a) \lim_{x \rightarrow 6} \frac{(x+6)(\cancel{x-6})}{(\cancel{x-6})}$$

$$= \lim_{x \rightarrow 6} x+6$$

$$= 6+6$$

$$= \textcircled{12}$$

$$b) \lim_{x \rightarrow 4} \frac{(x+4)(\cancel{x-4})}{(\cancel{x-4})}$$

$$= \lim_{x \rightarrow 4} x-4$$

$$= 4-4$$

$$= \textcircled{0}$$

$$c) \lim_{x \rightarrow 5} \frac{(3x+1)(\cancel{x-5})}{(\cancel{x-5})}$$

$$= \lim_{x \rightarrow 5} 3x+1$$

$$= 3(5)+1$$

$$= \textcircled{16}$$

2. Evaluate the following limits. If any intermediate steps or work in necessary, show it. Do not just use a calculator on these limits, use an algebraic approach for any indeterminate forms.

$$a) \lim_{x \rightarrow 5} \frac{10}{x-5} = \frac{10}{5-5} =$$

$\textcircled{\text{DNE}}$

$$b) \lim_{x \rightarrow 1} \frac{x^2 - x - 20}{x - 5}$$

$$= \frac{1^2 - 1 - 20}{1 - 5}$$

$$= \frac{1 - 1 - 20}{-4}$$

$$= \frac{-20}{-4} = \textcircled{5}$$

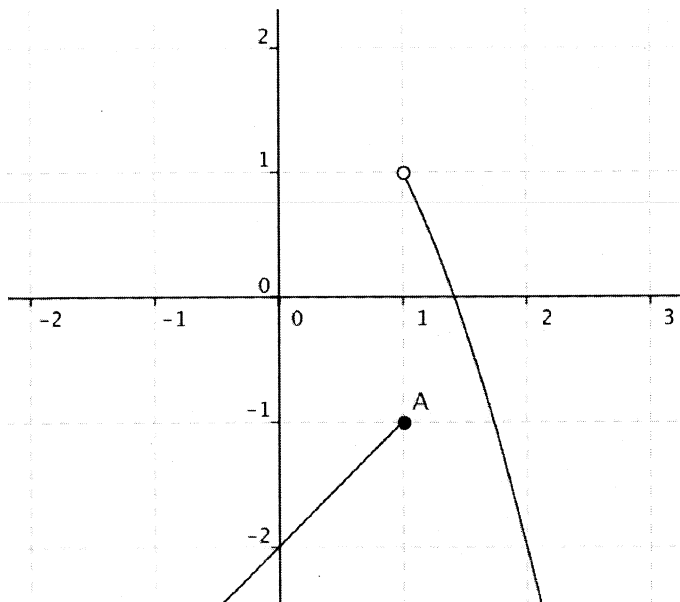
$$c) \lim_{x \rightarrow 3} \frac{x^2 - x - 20}{x - 5}$$

$$= \frac{3^2 - 3 - 20}{3 - 5}$$

$$= \frac{9 - 3 - 20}{-2}$$

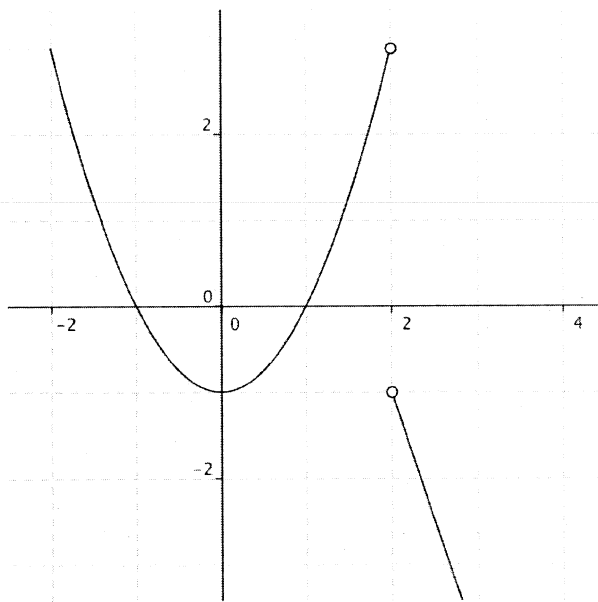
$$= \frac{-14}{-2} = \textcircled{7}$$

3. For each piecewise function graphed below, evaluate each limit or functional value. $f(x)$ is the function on the left and $g(x)$ is the function on the right.



a) $f(1) = -1$

b) $\lim_{x \rightarrow 1^-} f(x) = -1$



c) $g(2) = \text{DNE}$

d) $\lim_{x \rightarrow 2} g(x) = \text{DNE}$
 because $\lim_{x \rightarrow 2^-} g(x) = 3 \neq -1$ and $\lim_{x \rightarrow 2^+} g(x) = -1$

4. Evaluate the following limits. If any intermediate steps or work in necessary, show it. Use a calculator on this problem to fill out the x-y chart below. Use the data from the table below to estimate what you think the limit of the function is. Write each number in the $f(x)$ column of the table with at least 3 decimal places.

Let $f(x) = \frac{x^3 - 7x - 6}{x - 3}$, $\lim_{x \rightarrow 3} f(x) = 20$

x	f(x)
1	6
2	12
2.9	19.11
2.99	19.91
3.01	20.09
3.1	20.91
4	30
5	42