

Name: _____

Grade: *Third year humanities*

Subject : *Mathematics*

Al-Marj Official High School

Date : / / 2012

Exam : *1st term*

Score : / 20

Q1) The table below is the table of variations of a function f defined over

$$]-\infty, -2[\cup]-2, +\infty[\text{ by } f(x) = -x + 1 - \frac{4}{x-2}$$

Designate by (C) its representative curve in an orthonormal system(o,i,j).

x	$-\infty$	0	2	4	$+\infty$	
$f'(x)$	-	0	+	+	0	-
$f(x)$						

1) a- find the $\lim_{x \rightarrow +\infty} f(x)$ and $\lim_{x \rightarrow -\infty} f(x)$ (1pts)

b- find $\lim_{x \rightarrow 2} f(x)$ and $\lim_{x \rightarrow 2} f(x)$. Deduce an asymptote to (C). (2pts)

2) Show that the straight line (d) of equation $y = -x + 1$ is an asymptote to (C). (2pts)

3) a- Verify that $f'(x) = \frac{x(4-x)}{(x-2)^2}$ (2pts)

b- Complete the table of variation of f . (2pts)

c- Calculate $f(-2)$, $f(0)$ and draw (d) and (C). (3pts)

d- Without any calculation, compare $f(9)$ and $f(10)$. (1pts)

4) Solve, graphically, the inequality $f(x) < 0$. (1pts)

Q2) Determine the following limits: (6pts)

a) $\lim_{x \rightarrow +\infty} \frac{2x+1}{x-1}$

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

c) $\lim_{\substack{x \rightarrow 3 \\ x > 3}} \frac{x^2-1}{x-3}$