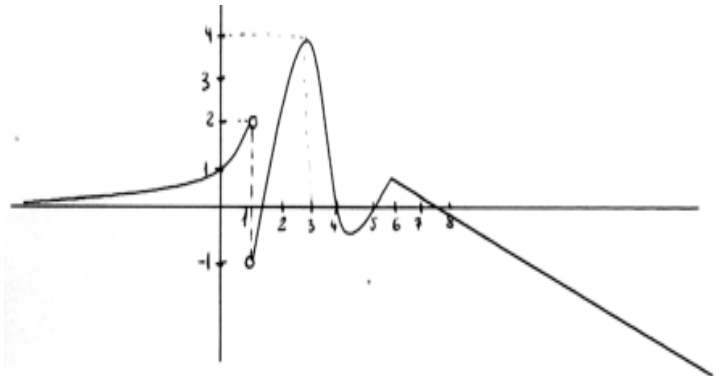# FUNCTIONS 1
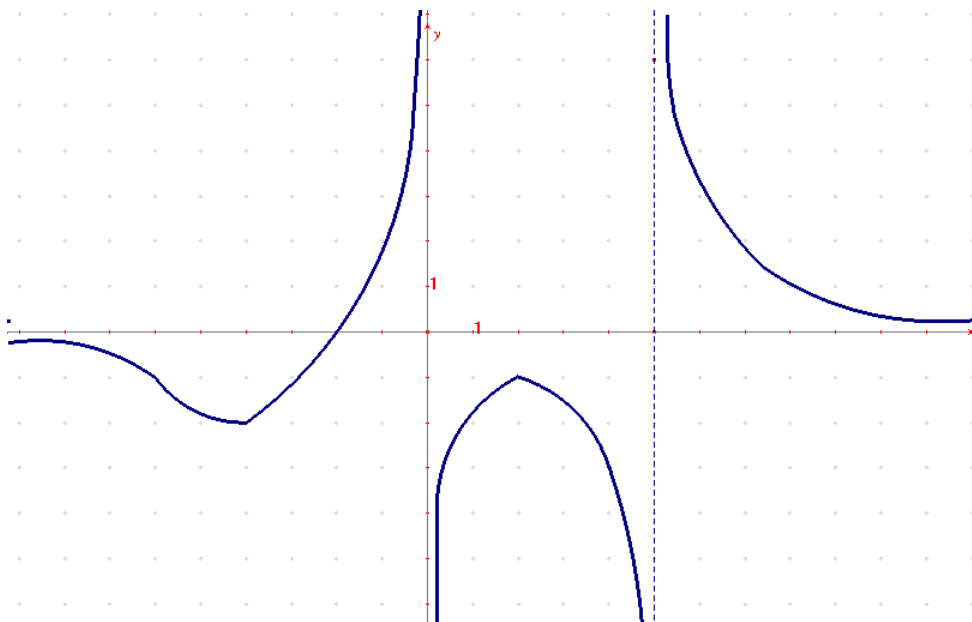
1. Use the graph to answer the following:

a. Find $f(0)$, $f(2)$ and $f(3)$.
b. Is $f(8)$ positive or negative?
c. Is $f(-2)$ positive or negative?
d. Domain and range
e. For what values of x is $f(x) = 0$?
f. For what values of x is $f(x) > 0$?
g. Intervals where the function is increasing or decreasing.
h. Local and absolute extrema (maximum ,minimum).
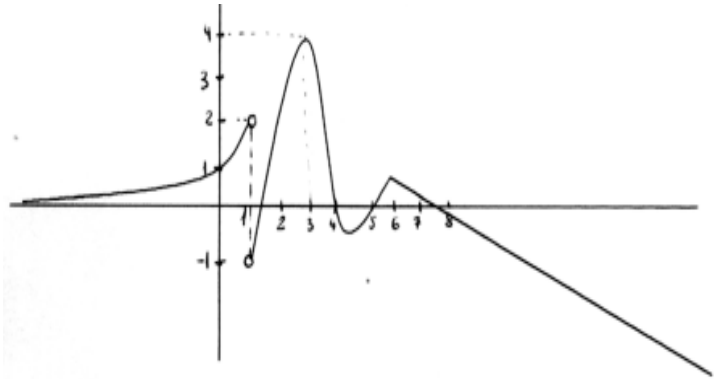i. Horizontal and vertical asymptotes, if any.

2. Use the graph to answer the following:
a. What is $f(2)$?
b. Find x so that $f(x) = 1$.
c. Find the zeros of $f(x)$.
d. What are the maximum and minimum?
e. On what intervals is $f(x)$ increasing?
f. On what intervals is $f(x)$ decreasing?
g. Domain and range.
h. Find the intersections with the x axis and the y axis
i. Horizontal and vertical asymptotes, if any.

SOLUTION

1.
a. $f(0) = 1$, $f(2) = 2$ and $f(3) = 4$.
b. $f(8)$ is negative
c. $f(-2)$ is positive
d. Domain $\Re - \{1\}$
range $(-\infty, 4)$
e. $f(1.3) = f(4) = f(5) = f(7.5) = 0$
f. $f(x) > 0$ in $(-\infty, 1) \cup (1.3, 4) \cup (5, 7.5)$
g. f is increasing in $(-\infty, 1) \cup (1,3) \cup (4.5, 6)$
f is decreasing in $(3, 4.5) \cup (6, +\infty)$
j. Local maximum $(3,4)$ and $(6,1)$, absolute maximum $(3,4)$
local minimum $(4.5, -0.5)$
k. Horizontal asymptote y = 0 (negative).

2. $f(2) = -1$
b. $f(x) = 1$ when x =-1.5 and when x = 8
c. the zero of $f(x)$ is x = -2
d. maximum $(2,-1)$ minimum $(-4,-2)$
e. $f(x)$ is increasing in $(-4,0) \cup (0,2)$
f. $f(x)$ is decreasing in $(-\infty, -4) \cup (2,5) \cup (5. +\infty)$
g. Domain $\Re - \{0,5\}$ and range $\Re$
h. intersections with the x axis $(-2,0)$ and with the y axis no intersection
i. Horizontal asymptote y = 0 and vertical asymptotes x = 0 and x = 5.