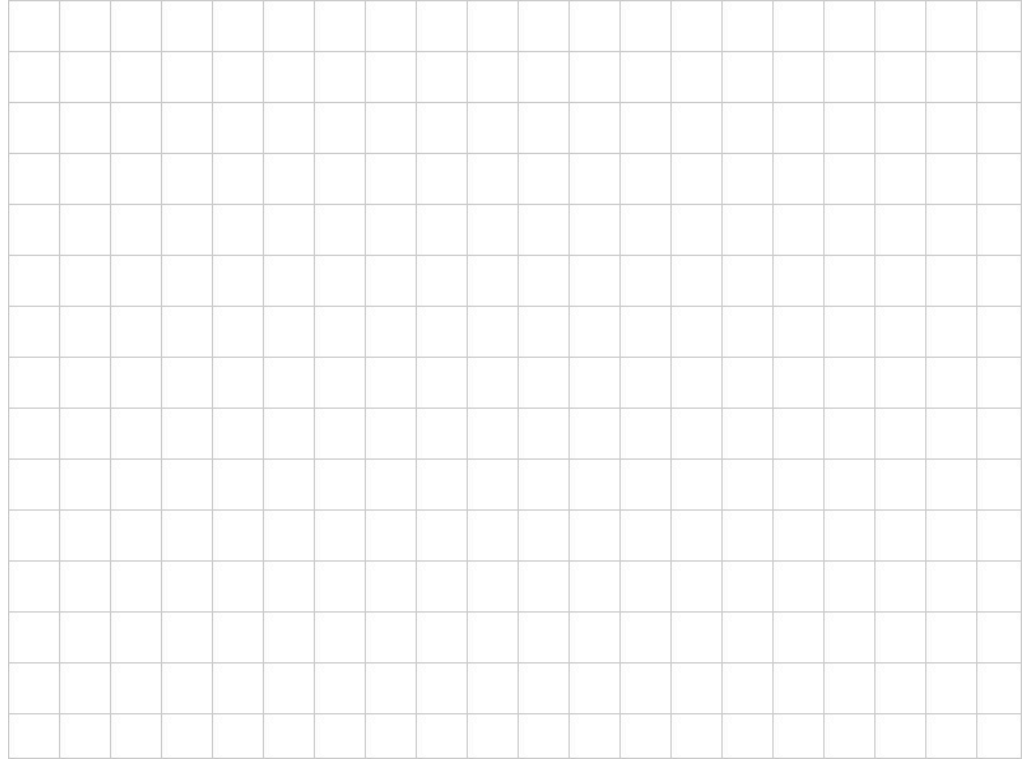


I. Draw carefully the hyperbola of equations $y = \frac{A}{x - L} + H$ by applying the

changes of variables defined by $X = x - L$ and $Y = y - H$ with $Y = \frac{A}{X}$

• $(H_1)y = \frac{1}{x - 3} + 2$



• $(H_2)y = -\frac{4}{x + 4} + 2$



II. Change the equation $y = \frac{ax+b}{cx+d}$ into $y = \frac{A}{x-L} + H$ then draw the corresponding

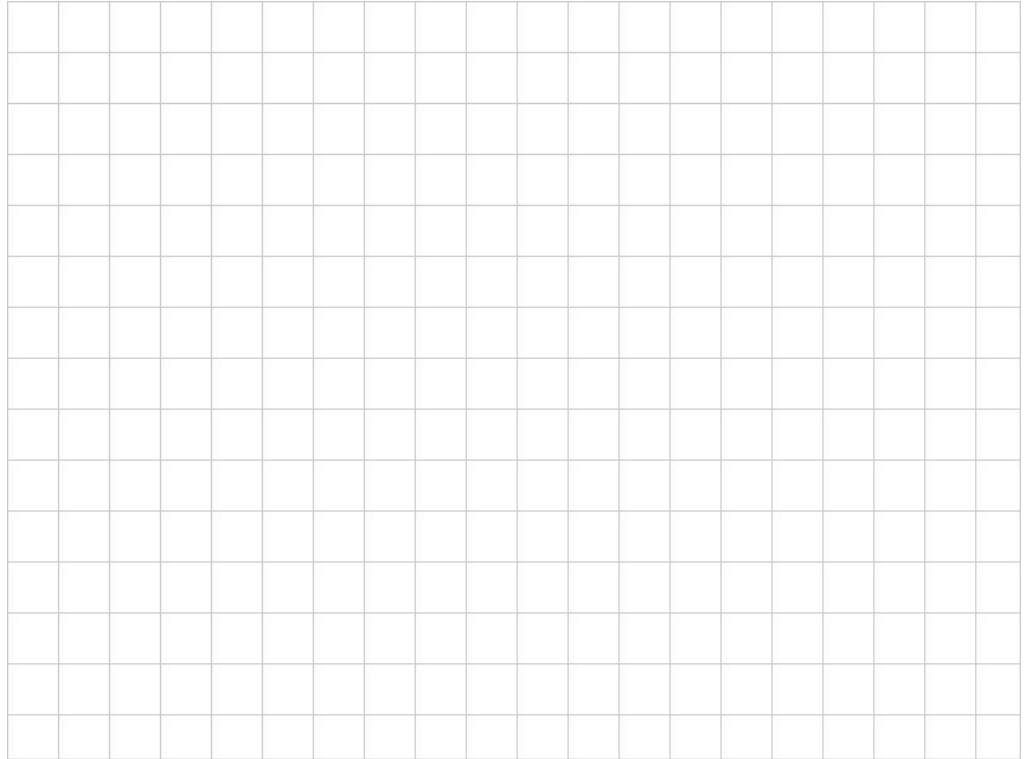
Hyperbola in showing the asymptotes and the symmetries.

• $(H_3)y = \frac{x-1}{x+3}$

Find A, H, L to change the equation into

$$y = \frac{A}{x+3} + H$$

and draw the hyperbola.



• $(H_4)y = \frac{2x+5}{x-2}$

Find A, H, L to change the equation into

$$y = \frac{A}{x-2} + H$$

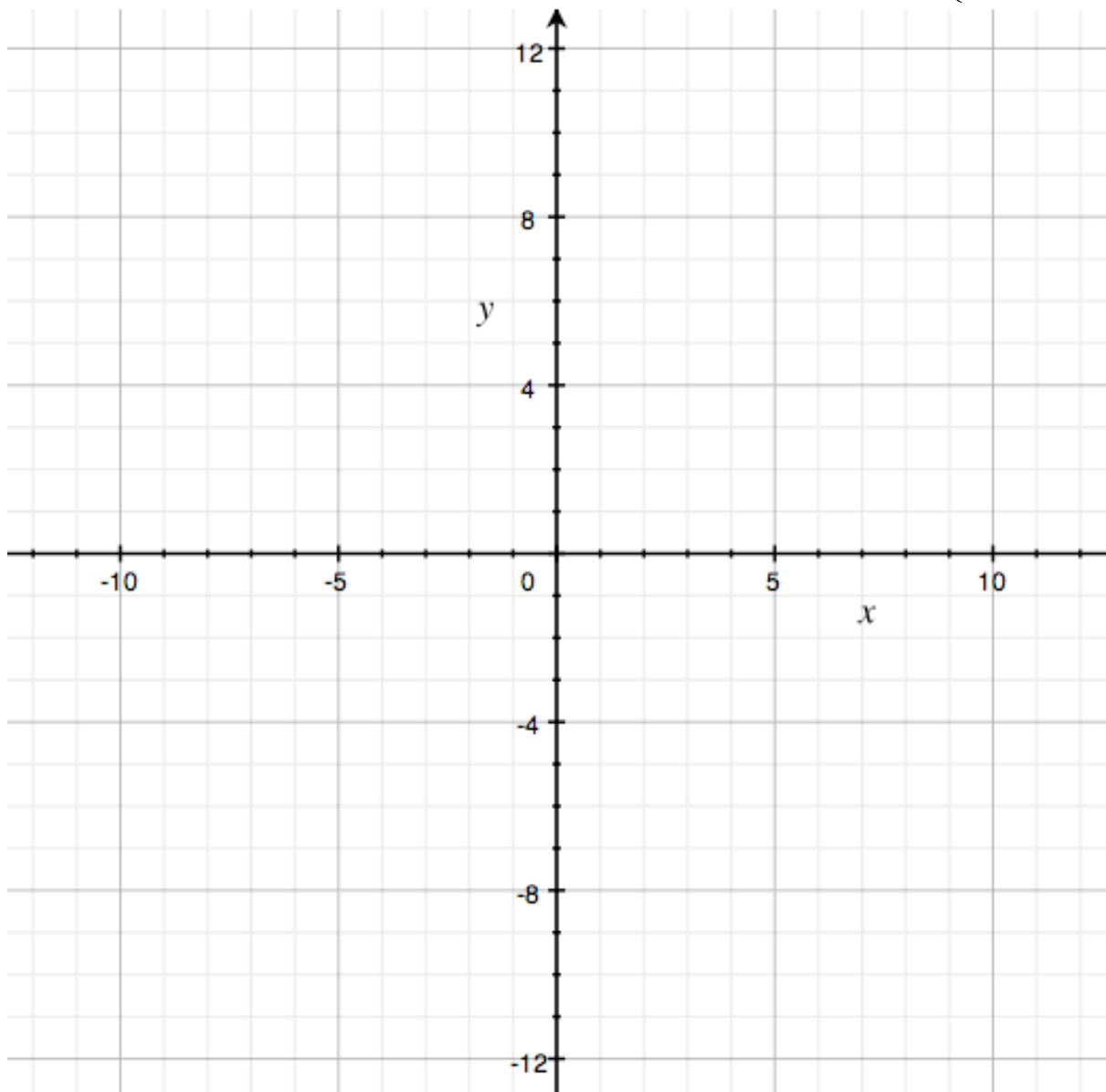
and draw the hyperbola.



III – Parabolas and Hyperbolas : Let $f(x) = -\frac{1}{4}x^2 - x + 3$ $g(x) = \frac{2x+12}{x+4}$

1. Draw carefully the graphs of the two functions in the same system of coordinates below.
Show the axis of symmetry of the Parabola and the asymptotes of the Hyperbola
2. Calculate and show the coordinates of intersections with the Ox and the Oy axes.
3. Solve the equation $f(x) = g(x)$ to find the coordinates of the intersection points of the Parabola and the Hyperbola. **Show your calculations on the space provided below.**

4. Shade the area of points $(x;y)$ corresponding to the system :
$$\begin{cases} y \leq -\frac{1}{4}x^2 - x + 3 \\ y \geq \frac{2x+12}{x+4} \end{cases}$$



IV – Parametric problem :

Let (D_m) be the variable straight line defined by $y = x + m$

and let (H) be the equilateral hyperbola defined by $y = \frac{3x+2}{x+2}$

1. Draw the hyperbola (H) and the lines (D_0) , (D_1) , (D_4) , (D_9) , (D_{10}) .
2. Discuss upon the values of m the number of intersecting points between (H) and (D_m) . **Show the calculations below** and check on the graph.
3. What special property can you observe about (D_1) and (D_9) ?

