

I – Let f be the function defined by $f(x) = -\frac{1}{4}x^2 + \frac{1}{2}x + 2$.

Let f_1, f_2, f_3, f_4 be the functions associated to f , defined by the following relationships :

$$f_1(x) = -f(x) \quad ; \quad f_2(x) = f(-x) \quad ; \quad f_3(x) = -f(-x), \quad f_4(x) = f(x-2) + 1$$

Draw the 5 parabolas P, P_1, P_2, P_3, P_4 of the 5 functions on the same graph below.
(Chose carefully the position of the origin to be able to show the curves properly, and use 5 different colors)
Explain which geometrical transformation of (P) correspond to each of these 4 new parabolas.



II – Let h be the function defined by $h(x) = \frac{2-x}{2+x}$.

Let h_1, h_2, h_3, h_4 be the functions associated to h , defined by the following relationships :

$$h_1(x) = |h(x)| \quad ; \quad h_2(x) = h(|x|) \quad ; \quad h_3(x) = |h(-x)|, \quad h_4(x) = h(x-2)+1$$

Draw the 5 hyperbolas H, H_1, H_2, H_3, H_4 of the 5 functions on the same graph below.

(Chose carefully the position of the origin to be able to show the curves properly, and use 5 different colors)

Explain which geometrical transformation of (H) correspond to each of these 4 new Hyperbolas.

