

LA FONCTION HOMOGRAPHIQUE

- 1. CALCULER LES ASYMPTOTES HORIZONTALES, LES ASYMPTOTES VERTICALES, LES ORDONNÉES À L'ORIGINE ET LES ZÉROS DE FONCTION DES FONCTIONS HOMOGRAPHIQUES SUIVANTES :**

	Fonction	Asymptote horizontale	Asymptote verticale	Ordonnée à l'origine	Zéro de fonction
1	$f(x) = \frac{2x-3}{x-4}$	$y = 2$	$x = 4$	$x = 0 \Rightarrow y = \frac{3}{4}$	$y = 0 \Rightarrow x = \frac{3}{2}$
2	$f(x) = \frac{5x+2}{x+1}$	$y = 5$	$x = -1$	$x = 0 \Rightarrow y = 2$	$y = 0 \Rightarrow x = -\frac{2}{5}$
3	$y = \frac{4-x}{2x-5}$	$y = -\frac{1}{2}$	$x = \frac{5}{2}$	$x = 0 \Rightarrow y = -\frac{4}{5}$	$y = 0 \Rightarrow x = 4$
4	$y = \frac{3x+5}{2x-1}$	$y = \frac{3}{2}$	$x = \frac{1}{2}$	$x = 0 \Rightarrow y = -5$	$y = 0 \Rightarrow x = -\frac{5}{3}$
5	$f(x) = \frac{2x}{3x+7}$	$y = \frac{2}{3}$	$x = -\frac{7}{3}$	$x = 0 \Rightarrow y = 0$	$y = 0 \Rightarrow x = 0$
6	$f(x) = \frac{1}{x}$	$y = 0$	$x = 0$	$x = 0 \Rightarrow y = \pm\infty$	$y = 0 \Rightarrow x = \pm\infty$

- 2. ÉTUDIER COMPLÈTEMENT LES FONCTIONS SUIVANTES :**

1. $y = \frac{x+1}{x-1}$

Asymptote hor. : $y = 1$

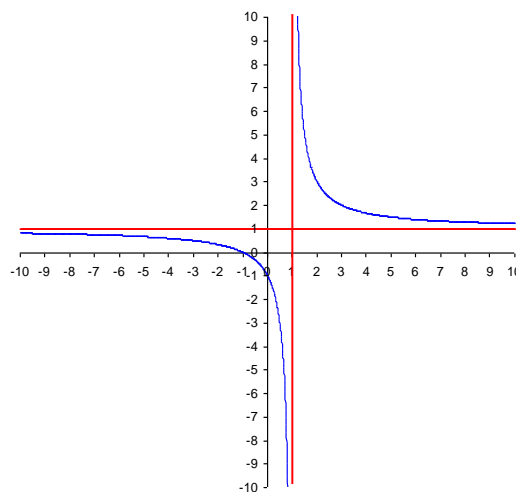
Asymptote ver. : $x = 1$

Or. à l'origine : $x = 0 \Rightarrow y = -1$

Zéro de fct : $y = 0 \Rightarrow x = -1$

Signe : $\frac{+}{-} \bigg| \frac{-1}{0} \bigg| \frac{1}{-} \bigg| \frac{+}{+} \rightarrow x$

TV : $\frac{x}{y} \bigg| \frac{-\infty}{1} \bigg| \frac{-1}{0} \bigg| \frac{0}{-1} \bigg| \frac{1}{-\infty} \bigg| \frac{+\infty}{1}$



$$2. y = \frac{2x+1}{-x+2}$$

Asymptote hor. : $y = -2$

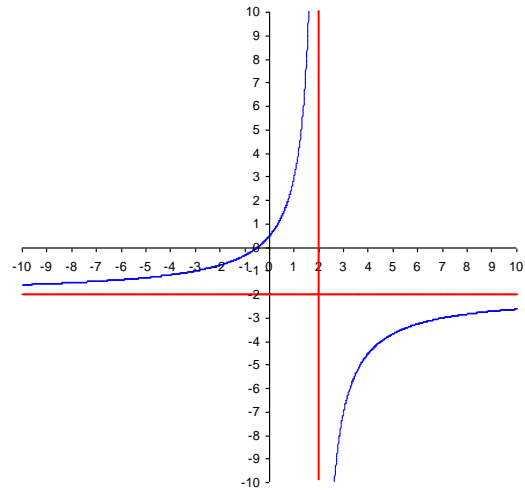
Asymptote ver. : $x = 2$

Or. à l'origine : $x = 0 \Rightarrow y = \frac{1}{2}$

Zéro de fct : $y = 0 \Rightarrow x = -\frac{1}{2}$

Signe : $\frac{-}{+} \left| \frac{-}{+} \right| \frac{+}{-} \rightarrow x$

TV : $\frac{x}{y} \left| \frac{-\infty}{-2} \nearrow \frac{-\frac{1}{2}}{0} \nearrow \frac{0}{\frac{1}{2}} \nearrow \frac{2}{+\infty} \nearrow \frac{+\infty}{-2} \right|$



$$3. f(x) = \frac{x-3}{x-2}$$

Asymptote hor. : $y = 1$

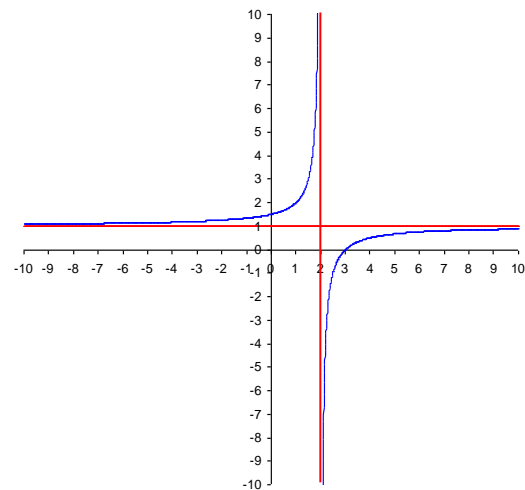
Asymptote ver. : $x = 2$

Or. à l'origine : $x = 0 \Rightarrow y = -\frac{3}{2}$

Zéro de fct : $y = 0 \Rightarrow x = 3$

Signe : $\frac{+}{-} \left| \frac{+}{-} \right| \frac{-}{+} \rightarrow x$

TV : $\frac{x}{y} \left| \frac{-\infty}{1} \nearrow \frac{0}{\frac{3}{2}} \nearrow \frac{2}{+\infty} \nearrow \frac{3}{0} \nearrow \frac{+\infty}{1} \right|$



$$4. y = \frac{2x-4}{-x+4}$$

Asymptote hor. : $y = -2$

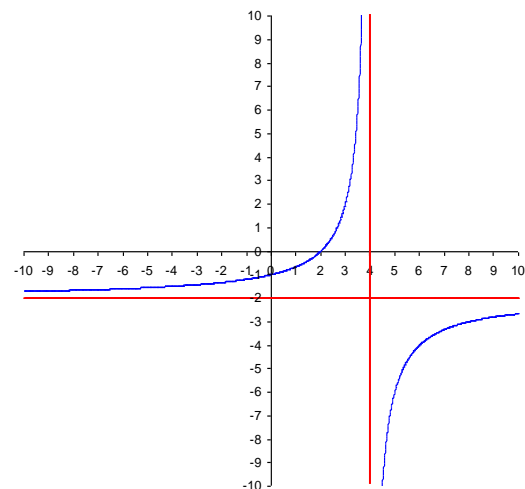
Asymptote ver. : $x = 4$

Or. à l'origine : $x = 0 \Rightarrow y = -1$

Zéro de fct : $y = 0 \Rightarrow x = 2$

Signe : $\frac{+}{-} \left| \frac{+}{-} \right| \frac{-}{+} \rightarrow x$

TV : $\frac{x}{y} \left| \frac{-\infty}{-2} \nearrow \frac{0}{-1} \nearrow \frac{2}{0} \nearrow \frac{4}{+\infty} \nearrow \frac{+\infty}{-2} \right|$



$$5. y = \frac{4x+2}{x+1}$$

Asymptote hor. : $y = 4$

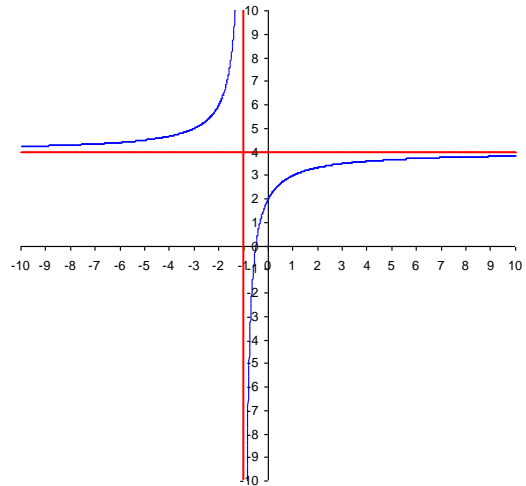
Asymptote ver. : $x = -1$

Or. à l'origine : $x = 0 \Rightarrow y = 2$

Zéro de fct : $y = 0 \Rightarrow x = -\frac{1}{2}$

Signe : $\frac{+}{-} \parallel \frac{-1}{-} \parallel \frac{-\frac{1}{2}}{0} \parallel \frac{+}{+} \rightarrow x$

TV : $\frac{x}{y} \left| \begin{array}{c} -\infty \\ 4 \end{array} \right. \nearrow \frac{-1}{+\infty} \parallel \nearrow \frac{-\frac{1}{2}}{0} \nearrow \frac{0}{2} \nearrow \frac{+\infty}{4}$



$$6. y = \frac{-4x+6}{2x+1}$$

Asymptote hor. : $y = -2$

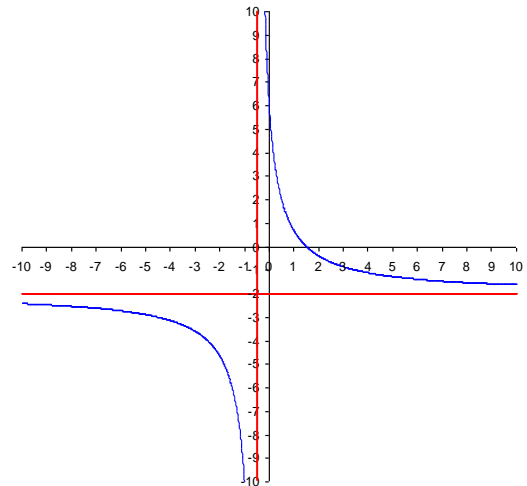
Asymptote ver. : $x = -\frac{1}{2}$

Or. à l'origine : $x = 0 \Rightarrow y = 6$

Zéro de fct : $y = 0 \Rightarrow x = \frac{3}{2}$

Signe : $\frac{-}{-} \parallel \frac{-\frac{1}{2}}{+} \parallel \frac{\frac{3}{2}}{0} \parallel \frac{+}{-} \rightarrow x$

TV : $\frac{x}{y} \left| \begin{array}{c} -\infty \\ -2 \end{array} \right. \searrow \frac{-\frac{1}{2}}{-\infty} \parallel \searrow \frac{0}{6} \searrow \frac{\frac{3}{2}}{0} \searrow \frac{+\infty}{-2}$



$$7. y = \frac{6x-12}{-4x+4}$$

Asymptote hor. : $y = -\frac{3}{2}$

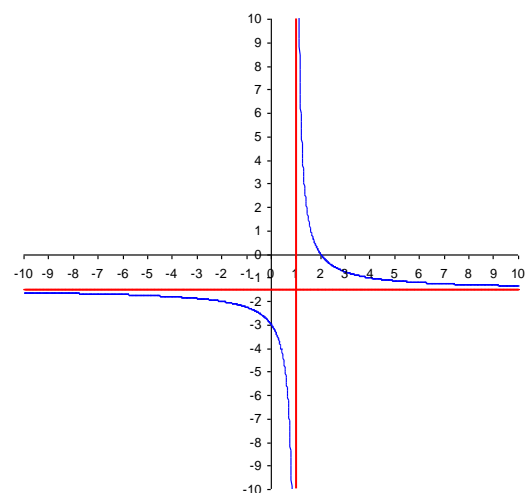
Asymptote ver. : $x = 1$

Or. à l'origine : $x = 0 \Rightarrow y = -3$

Zéro de fct : $y = 0 \Rightarrow x = 2$

Signe : $\frac{+}{-} \parallel \frac{1}{+} \parallel \frac{2}{0} \parallel \frac{+}{-} \rightarrow x$

TV : $\frac{x}{y} \left| \begin{array}{c} -\infty \\ -\frac{3}{2} \end{array} \right. \searrow \frac{0}{-3} \searrow \frac{1}{-\infty} \searrow \frac{2}{0} \searrow \frac{+\infty}{-\frac{3}{2}}$



$$8. f(x) = \frac{2x-5}{x}$$

Asymptote hor. : $y = 2$

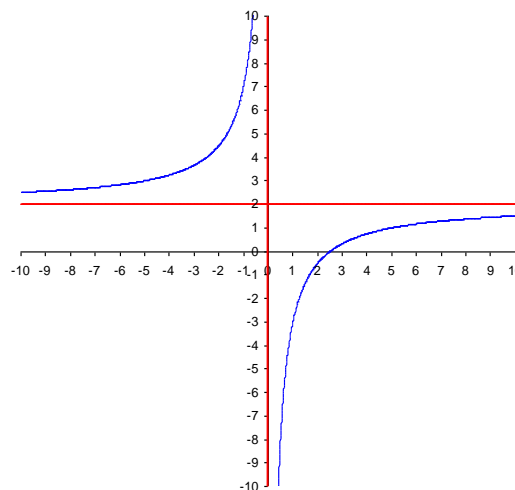
Asymptote ver. : $x = 0$

Or. à l'origine : $x = 0 \Rightarrow y = \pm\infty$

$$\text{Zéro de fct : } y = 0 \Rightarrow x = \frac{5}{2}$$

$$\text{Signe : } \begin{array}{c} + \\ \hline \end{array} \begin{array}{c} 0 \\ \hline \end{array} \begin{array}{c} \frac{5}{2} \\ \hline \end{array} \begin{array}{c} + \\ \hline \end{array} \rightarrow x$$

$$\text{TV : } \frac{x}{y} \left| \begin{array}{c} -\infty \\ 2 \end{array} \right. \nearrow \begin{array}{c} 0 \\ +\infty \end{array} \left| \begin{array}{c} \frac{5}{2} \\ 0 \end{array} \right. \nearrow \begin{array}{c} +\infty \\ 2 \end{array}$$



$$9. y = \frac{1}{x}$$

Asymptote hor. : $y = 0$

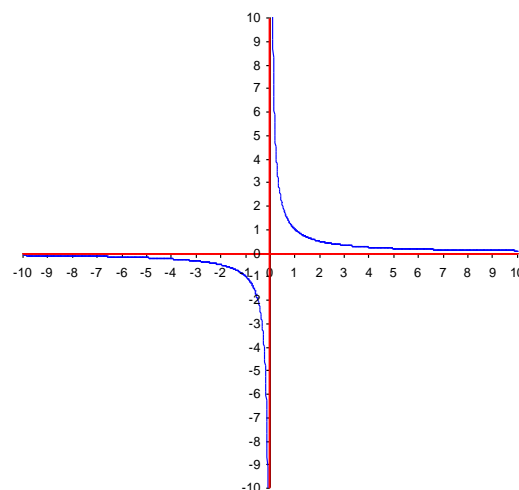
Asymptote ver. : $x = 0$

Or. à l'origine : $x = 0 \Rightarrow y = \pm\infty$

$$\text{Zéro de fct : } y = 0 \Rightarrow x = \pm\infty$$

$$\text{Signe : } \begin{array}{c} 0 \\ \hline \end{array} \begin{array}{c} + \\ \hline \end{array} \rightarrow x$$

$$\text{TV : } \frac{x}{y} \left| \begin{array}{c} -\infty \\ 0 \end{array} \right. \searrow \begin{array}{c} 0 \\ -\infty \end{array} \left| \begin{array}{c} +\infty \\ 0 \end{array} \right. \searrow \begin{array}{c} +\infty \\ 0 \end{array}$$



$$10. y = \frac{-5}{x}$$

Asymptote hor. : $y = 0$

Asymptote ver. : $x = 0$

Or. à l'origine : $x = 0 \Rightarrow y = \pm\infty$

$$\text{Zéro de fct : } y = 0 \Rightarrow x = \pm\infty$$

$$\text{Signe : } \begin{array}{c} + \\ \hline \end{array} \begin{array}{c} 0 \\ \hline \end{array} \begin{array}{c} \frac{5}{2} \\ \hline \end{array} \begin{array}{c} + \\ \hline \end{array} \rightarrow x$$

$$\text{TV : } \frac{x}{y} \left| \begin{array}{c} -\infty \\ 0 \end{array} \right. \nearrow \begin{array}{c} 0 \\ +\infty \end{array} \left| \begin{array}{c} \frac{5}{2} \\ 0 \end{array} \right. \nearrow \begin{array}{c} +\infty \\ 0 \end{array}$$

