1) $f(x) = 2x - \sin(x)$ $\quad D_f = \mathbb{R}$

$\lim\limits_{+\infty} f(x) = +\infty$ $\quad \lim\limits_{-\infty} f(x) = -\infty$

$\lim\limits_{+\infty} \frac{f(x)}{x} = \lim\limits_{+\infty} 2 - \frac{\sin(x)}{x} = 2$; $\lim\limits_{-\infty} \frac{f(x)}{x} = \lim\limits_{-\infty} 2 - \frac{\sin(x)}{x} = 2$

$\lim\limits_{+\infty} f(x) - 2x = \lim\limits_{+\infty} -\sin(x)$ n'existe pas

$\lim\limits_{-\infty} f(x) - 2x = \lim\limits_{-\infty} -\sin(x)$ n'existe pas.

Donc 0 Asymptote

2) $f(x) = \frac{x^2+1}{x-1}$ $\quad D_f = \mathbb{R} - \{1\}$

$\lim\limits_{x \to 1^+} f(x) = +\infty$ $\quad \lim\limits_{1^-} f(x) = -\infty$ $\quad$ 1 Asymptote verticale $x = 1$

$\lim\limits_{+\infty} f(x) = +\infty$ $\quad \lim\limits_{-\infty} f(x) = -\infty$

$\lim\limits_{+\infty} \frac{f(x)}{x} = \lim\limits_{+\infty} \frac{x^2+1}{x^2-x} = 1$ $\quad \lim\limits_{+\infty} f(x) - x = \lim\limits_{+\infty} \frac{x^2+1}{x-1} - x = \lim\limits_{+\infty} \frac{x^2+1-x^2+x}{x-1}$

$= 1$

$= \lim\limits_{-\infty} f(x)$

1 Asymptote oblique $y = x + 1$

Donc 2 Asymptotes

3) $f(x) = x^2 - 2x + 4$ $\quad D_f = \mathbb{R}$

$\lim\limits_{+\infty} f(x) = +\infty$ $\quad \lim\limits_{-\infty} f(x) = +\infty$

$\lim\limits_{+\infty} \frac{f(x)}{x} = +\infty$ $\quad \lim\limits_{-\infty} \frac{f(x)}{x} = -\infty$

Donc 0 Asymptote

4) $f(x) = \dfrac{x-2}{x-3}$ $\quad D_f = \mathbb{R} - \{3\}$

$\lim\limits_{-\infty} f(x) = 1$ $\quad \lim\limits_{+\infty} f(x) = 1$ $\quad$ Asymptote horizontale $y = 1$

$\lim\limits_{3^+} f(x) = +\infty$ $\quad \lim\limits_{3^-} f(x) = -\infty$ $\quad$ Asymptote verticale $x = 3$

Rmq 2 Asymptotes

5) $f(x) = \dfrac{2x+3}{(x^2+3x)}$ $\quad D_f = \mathbb{R} - \{0; -3\}$

$\lim\limits_{0^+} f(x) = +\infty$ $\quad \lim\limits_{0^-} f(x) = -\infty$ $\quad$ Asymptote verticale $x = 0$

$\lim\limits_{-3^+} f(x) = +\infty$ $\quad \lim\limits_{-3^-} f(x) = -\infty$ $\quad$ Asymptote verticale $x = -3$

$\lim\limits_{+\infty} f(x) = 0$ $\quad \lim\limits_{-\infty} f(x) = 0$ $\quad$ Asymptote horizontale $y = 0$

Rmq 3 Asymptotes