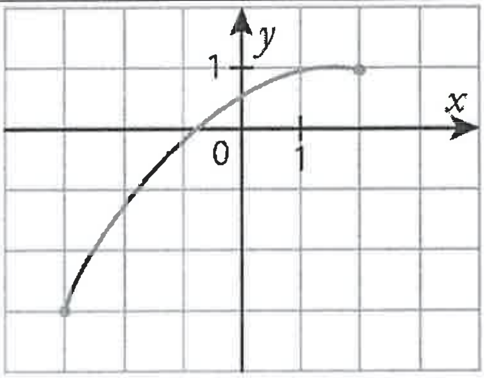
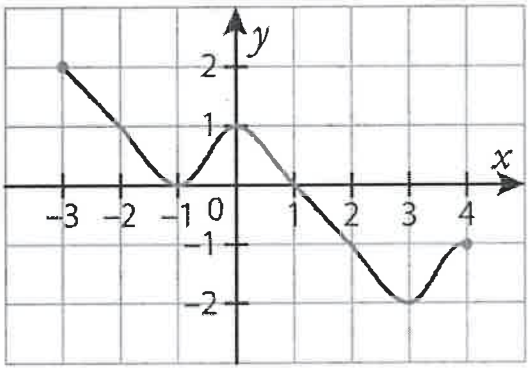
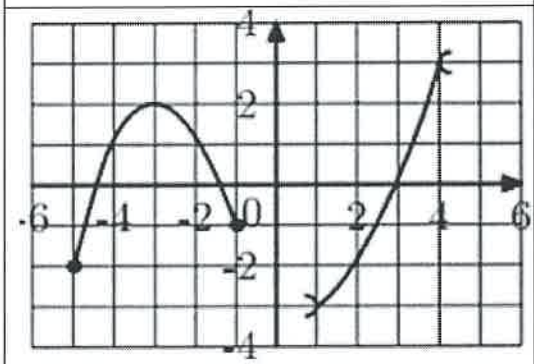
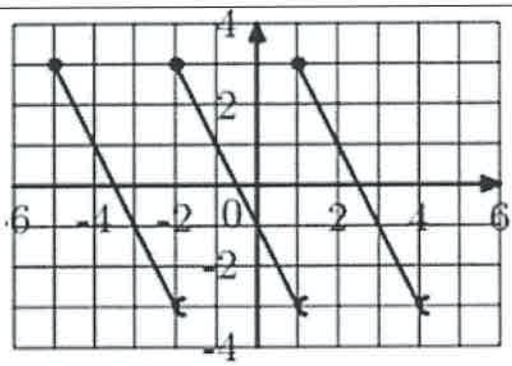
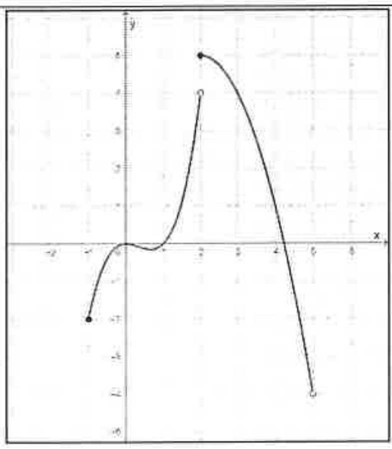
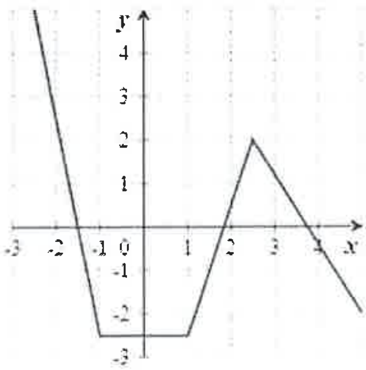
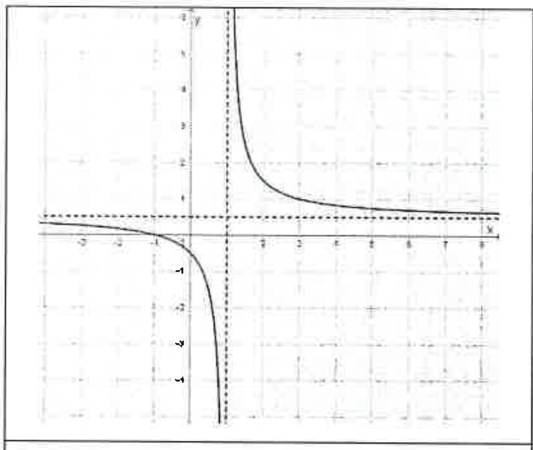
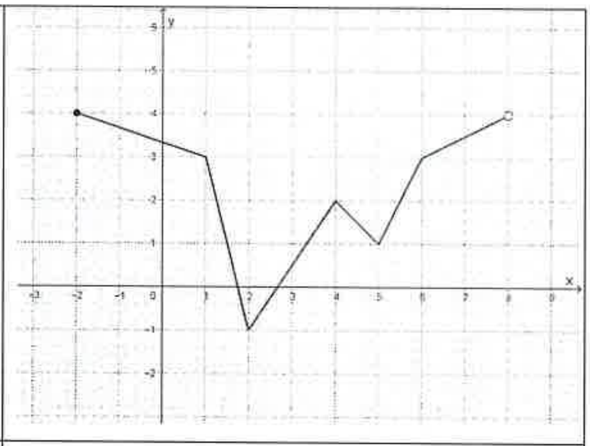
Exercices de renforcement
2. Domaine de définition

1. Détermine le domaine de définition de chaque fonction :

	
dom f = $[-3;2]$	*dom f* = $[-3;4]$
	
dom f = $[-5;-1] \cup]1;4[$	*dom f* = $[-5;4[$
	
dom f = $[-1;5[$	*dom f* = $\mathbb{R}$

	
$dom\, f = \mathbb{R}\backslash\{1\}$	$dom\, f = [-2;8[$

2. Pose les conditions d'existence et détermine le domaine de définition des fonctions suivantes :

(1) $f(x)=3+2\sqrt{x}$

CE : $x \geq 0$ $\qquad$ $dom\, f = \mathbb{R}^+$

(2) $f(x)=\dfrac{5+x}{10-x}$

CE : $10-x \neq 0$

$x \neq 10$ $\qquad$ $dom\, f = \mathbb{R}\backslash\{10\}$

(3) $f(x)=4x+\dfrac{1}{x}$

CE : $x \neq 0$ $\qquad$ $dom\, f = \mathbb{R}_0$

(4) $f(x)=\dfrac{3x}{2x^2+8x}$

CE : $2x^2+8x \neq 0$

$2x.(x+4) \neq 0$

$x \neq 0$ $\quad$ $x \neq -4$ $\qquad$ $dom\, f = \mathbb{R}\backslash\{0;-4\}$

(5) $f(x)=3x^3-3x$

CE : aucune $\qquad$ $dom\, f = \mathbb{R}$

(6) $f(x)=\dfrac{1}{x^2-1}$

CE : $x^2-1 \neq 0$

$(x-1)(x+1) \neq 0$

$x \neq 1$ $\quad$ $x \neq -1$ $\qquad$ $dom\, f = \mathbb{R}\backslash\{\pm 1\}$

(7) $f(x)=\sqrt{3-4x}$

CE: $3-4x \geqslant 0$

$3 \geqslant 4x$

$\frac{3}{4} \geqslant x$

dom $f = \leftarrow ; \frac{3}{4}]$

(8) $f(x)=\dfrac{\sqrt{3x+4}}{\sqrt{x-1}}$

CE1: $3x+4 \geqslant 0$

$x \geqslant -\frac{4}{3}$

CE2: $x-1>0$

$x>1$

dom $f =]1; \rightarrow$

(9) $f(x)=\sqrt{-2x}$

CE: $-2x \geqslant 0$

$x \leqslant 0$

dom $f = \mathbb{R}^-$

(10) $f(x)=\dfrac{1}{2x^2-8x+8}$

CE: $2x^2-8x+8 \neq 0$

$2.(x^2-4x+4) \neq 0$

$2.(x-2)^2 \neq 0 \iff x \neq 2$

dom $f = \mathbb{R} \setminus \{2\}$

(11) $f(x)=\dfrac{3}{\sqrt{3x-6}}$

CE: $3x-6>0$

$x>2$

dom $f =]2; \rightarrow$

(12) $f(x)=\dfrac{\sqrt{2-x}}{\sqrt{5x-1}}$

CE1: $2-x \geqslant 0$

$x \leqslant 2$

CE2: $5x-1>0$

$x>\frac{1}{5}$

dom $f =]\frac{1}{5}; 2]$

(13) $f(x)=\sqrt{1-x}+\sqrt{2x+3}$

CE1: $1-x \geqslant 0$

$x \leqslant 1$

CE2: $2x+3 \geqslant 0$

$x \geqslant -\frac{3}{2}$

dom $f = [-\frac{3}{2}; 1]$

(14) $f(x)=\frac{1}{x-2}+\frac{1}{x+2}$

CE1: $x-2\neq 0$ CE2: $x+2\neq 0$

$x\neq 2$ $x\neq -2$ dom $f=\mathbb{R}\setminus\{\pm 2\}$

(15) $f(x)=\frac{3x+1}{4x^2-36}$

CE: $4x^2-36\neq 0$

$(2x-6).(2x+6)\neq 0$

$x\neq 3$ $x\neq -3$ dom $f=\mathbb{R}\setminus\{\pm 3\}$

(16) $f(x)=\frac{3x+1}{(2x+3)(2x-3)}$

CE: $(2x+3).(2x-3)\neq 0$

$x\neq -\frac{3}{2}$ $x\neq \frac{3}{2}$ dom $f=\mathbb{R}\setminus\{-\frac{3}{2};\frac{3}{2}\}$

(17) $f(x)=\frac{2}{x+3}+\frac{3}{x}$

CE1: $x+3\neq 0$ CE2: $x\neq 0$ dom $f=\mathbb{R}\setminus\{-3;0\}$

$x\neq -3$

(18) $f(x)=\frac{\sqrt{x}}{x-1}$

CE1: $x\geqslant 0$ CE2: $x-1\neq 0$ dom $f=\mathbb{R}^+\setminus\{1\}$

$x\neq 1$

3. Invente l'expression analytique d'une fonction dont le domaine de définition est $[1;4[$.

$f(x)=\frac{\sqrt{x-1}}{\sqrt{4-x}}$