Fonctions quadratiques

12.03.25

3.4.7 Dessiner les graphes des fonctions f suivantes

a) $f(x) = x^2 - 4x$

x	$f(x)$	
-2	12	} +
-1	5	
0	0	
1	-3	
2	-4	axe de symétrie
3	-3	
4	0	
5	5	} +
6	12	

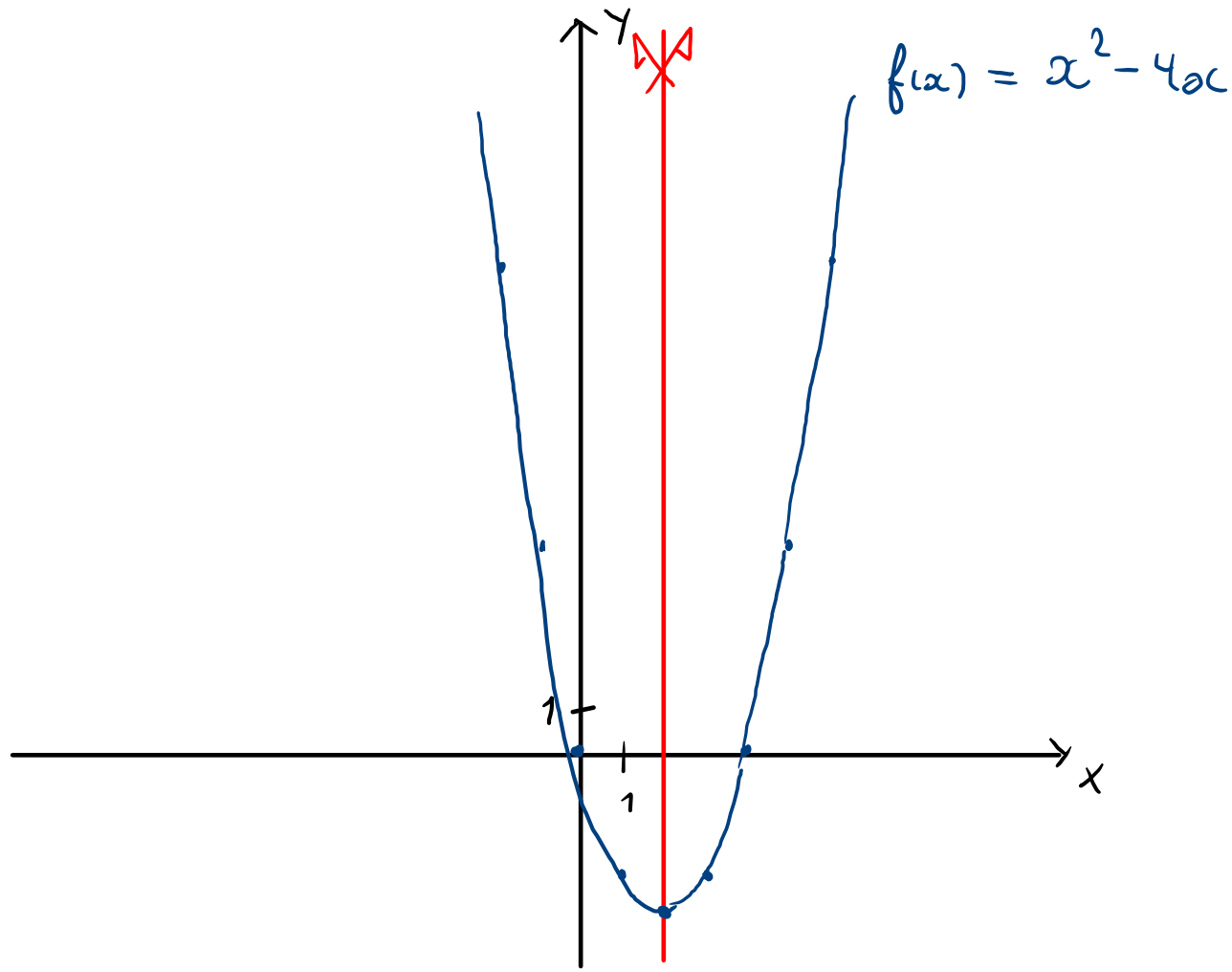
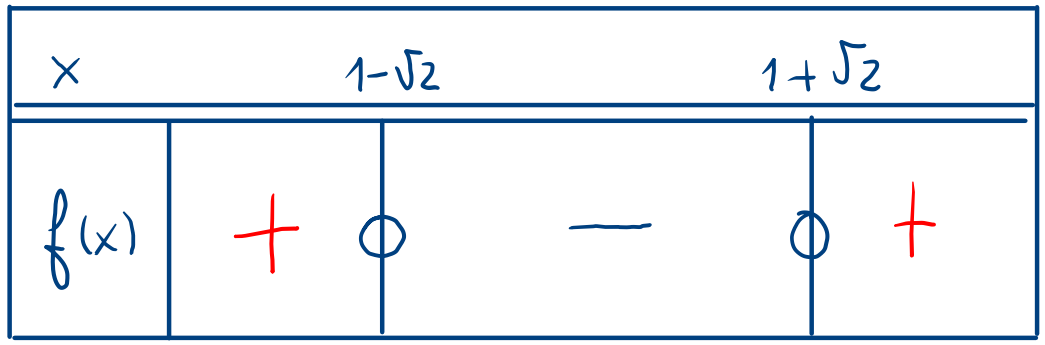


Tableau des signes

x		0		4	
$f(x)$	+	0	−	0	+

b) $f(x) = 2x^2 - 4x - 2$



$\sqrt{8} = \sqrt{4} \cdot \sqrt{2} = 2\sqrt{2}$

$\nexists$: $x = 1$

On calcule les zéros de $f(x)$

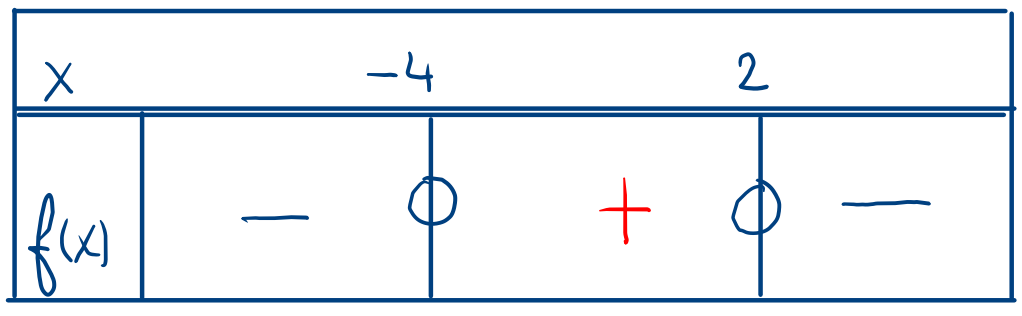
$$2x^2 - 4x - 2 = 0 \quad \Big| \div 2$$
$$x^2 - 2x - 1 = 0$$

$\Delta = 4 + 4 = 8$

$$z_1 = \frac{2 + \sqrt{8}}{2} = \frac{2 + 2\sqrt{2}}{2} = \frac{\cancel{2}(1+\sqrt{2})}{\cancel{2}} = 1 + \sqrt{2}$$

$$z_2 = 1 - \sqrt{2}$$

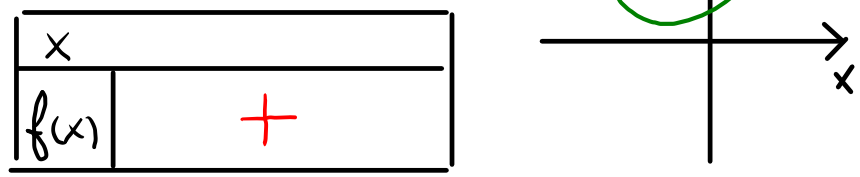
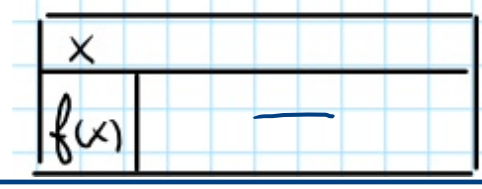
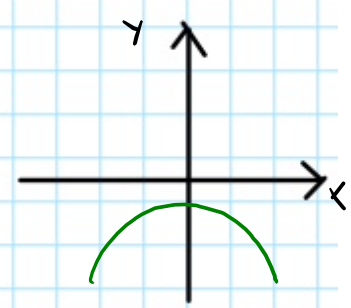
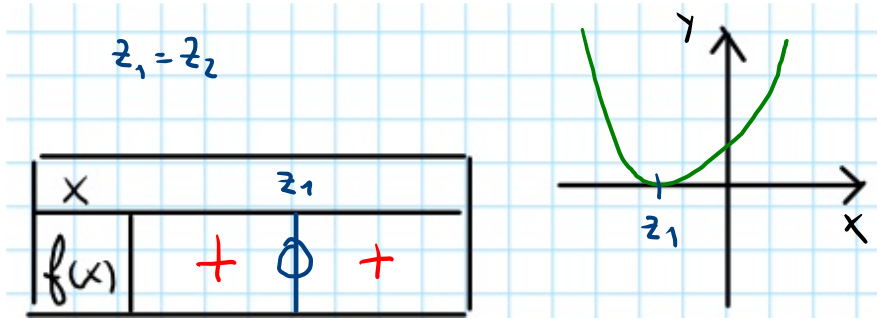
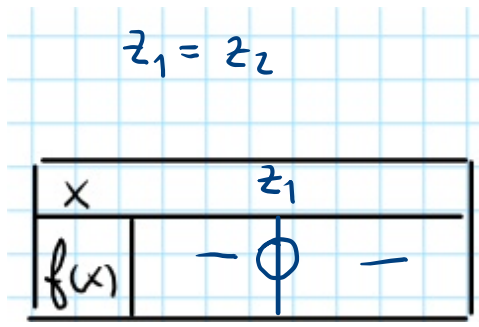
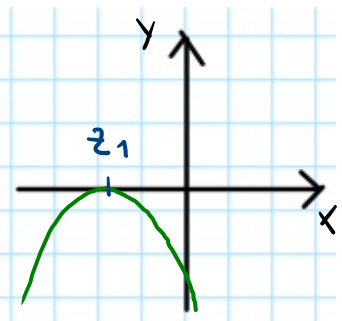
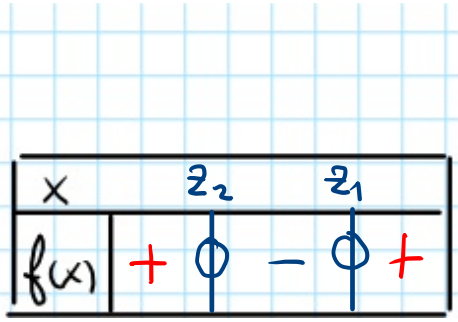
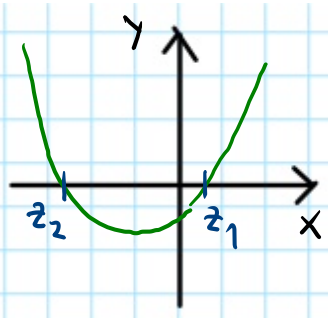
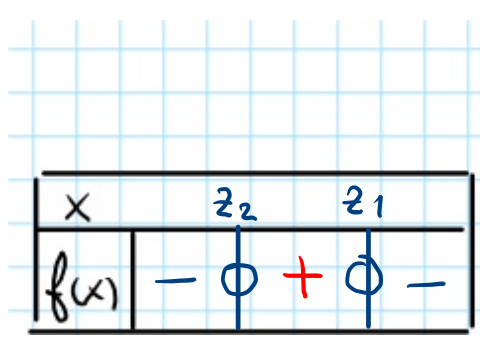
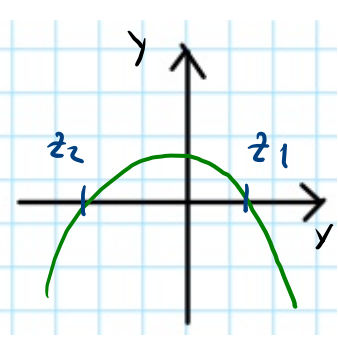
d) $f(x) = -\frac{1}{2}x^2 - x + 4$



$\nexists$: $x = -1$

$$-\frac{1}{2}x^2 - x + 4 = 0 \quad \Big| \cdot(-2)$$
$$x^2 + 2x - 8 = 0$$
$$(x + 4)(x - 2) = 0$$

Résumé : $f(x) = ax^2 + bx + c$, $a = 0$

	$a > 0$	$a < 0$
$\Delta < 0$		 
$\Delta = 0$		 
$\Delta > 0$	 	 

3.4.8 Etudier le signe des trinômes.

a) $6\,x^2 - x - 2$

b) $8\,x^2 - 10x + 3$

c) $-x^2 + 6\,x - 9$

d) $-2\,x^2 + 7\,x + 4$

e) $25\,x^2 - 30\,x + 34$

f) $-3\,x^2 + 24\,x - 60$

g) $6\,x^2$

h) $6\,x^2 + 7\,x$

i) $8\,x^2 - 25$

j) $9\,x^2 - 42\,x + 9$