

# Exercise\_1

Saturday, October 11, 2025 8:17 PM

11 If  $f(x) = x^2 - 5x + 6$  and  $g(x) = 2x^2 - 5x - 18$ , state the two functions  $f, g$  when they are positive together or negative together.

12 Prove that for all the values of  $k \in \mathbb{R}$  the two roots of the equation:

$$2x^2 - kx + k - 3 = 0$$

are real and different.

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$$f(x) = x^2 - 5x + 6$$

$$\begin{aligned} a &= 1 \\ b &= -5 \\ c &= 6 \end{aligned}$$

① disc:

$$\begin{aligned} b^2 - 4ac &= (-5)^2 - 4 \cdot 1 \cdot 6 \\ &= 25 - 24 = 1 > 0 \end{aligned}$$

two real diff. roots

$$\begin{aligned} x^2 - 5x + 6 &= 0 \\ (x-3)(x-2) &= 0 \\ x-3=0 & \quad x-2=0 \\ \boxed{x=3} & \quad \boxed{x=2} \end{aligned}$$

$$g(x) = 2x^2 - 5x - 18$$

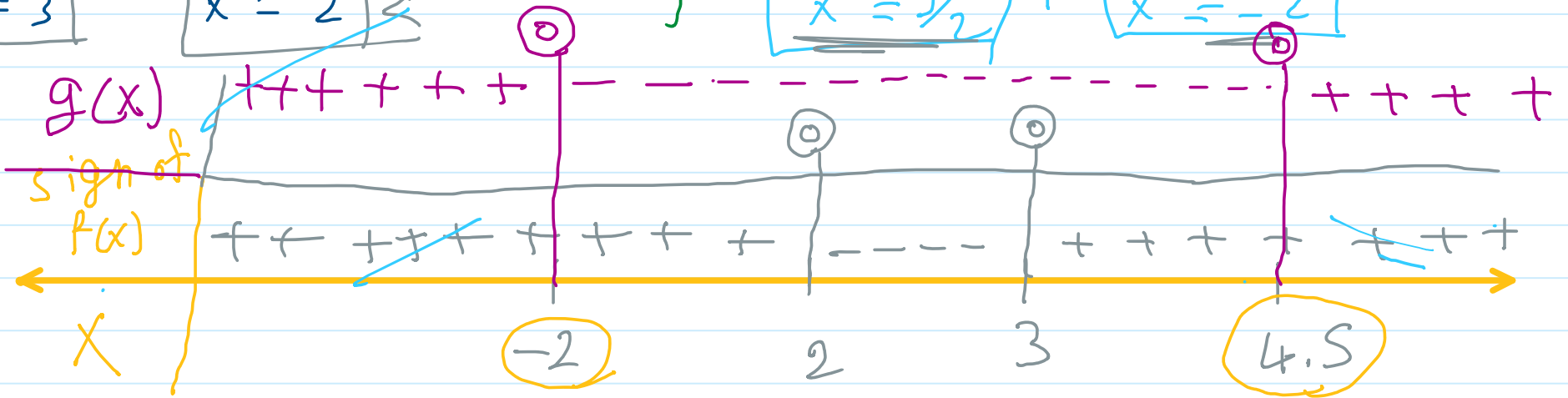
$$\begin{aligned} a &= 2 \\ b &= -5 \\ c &= -18 \end{aligned}$$

① disc:

$$\begin{aligned} b^2 - 4ac &= (-5)^2 - 4 \cdot 2 \cdot (-18) \\ &= 25 + 144 = 169 > 0 \end{aligned}$$

two real diff.

$$\begin{aligned} 2x^2 - 5x - 18 &= 0 \\ (2x-9)(x+2) &= 0 \\ 2x-9=0 & \quad x+2=0 \\ \boxed{x=9/2} & \quad \boxed{x=-2} \end{aligned}$$

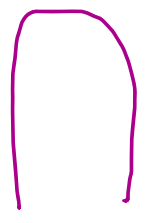


$$\begin{aligned} \text{+ve} &\rightarrow \boxed{x < -2}, \boxed{x > 4.5} \rightarrow \\ &\hookrightarrow ]-\infty, -2[ \cup ]4.5, \infty[ / \mathbb{R} - [-2, 4.5] \end{aligned}$$

$$\text{-ve} \rightarrow ]2, 3[$$

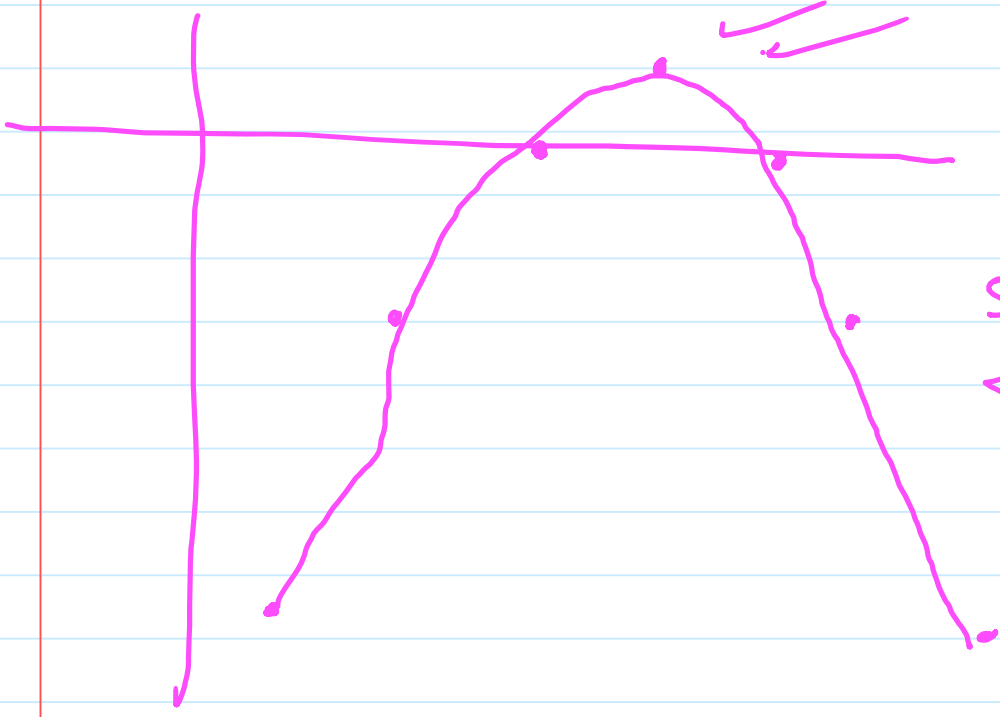
# Exercise\_2

Saturday, October 11, 2025 8:21 PM

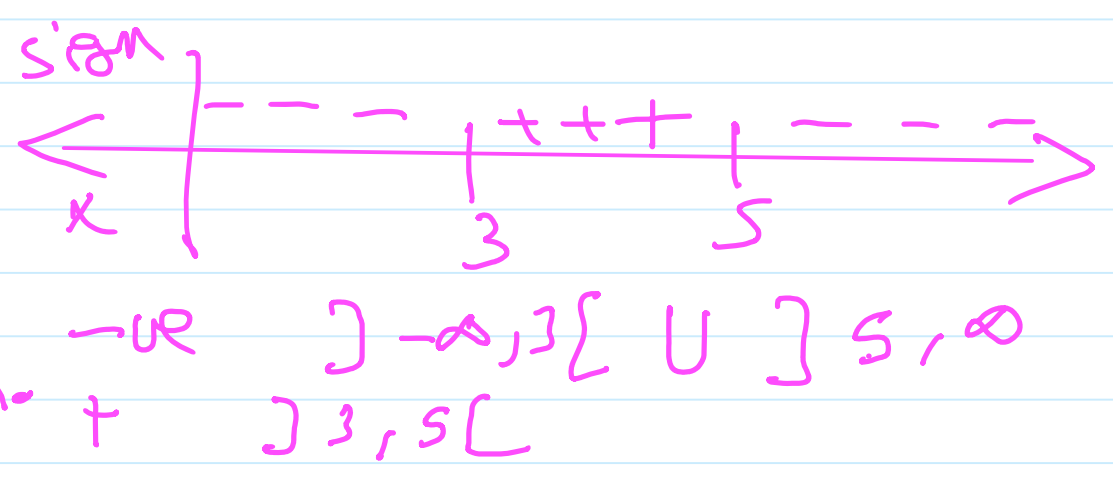


Draw the curve of the function  $f: f(x) = -x^2 + 8x - 15$  in  $[1, 7]$  from the graph, determine the sign of  $f$  in  $\mathbb{R}$  and the solution of the equation  $f(x) = 0$

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x	1	2	3	4	5	6	7
y	-8	-3	0	1	0	-3	-8



$f(x) = 0$  when  $x = 3$  &  $x = 5$

### Exercise\_3

Sunday, October 12, 2025 9:30 AM

11 If  $f(x) = x^2 - 5x + 6$  and  $g(x) = 2x^2 - 5x - 18$ , state the two functions  $f, g$  when they are positive together or negative together.

12 Prove that for all the values of  $k \in \mathbb{R}$  the two roots of the equation:  
 $2x^2 - kx + k - 3 = 0$  are real and different.

$$(12) \quad a = 2 \quad b = -k \quad c = k - 3$$

$$b^2 - 4ac > 0$$

$$(-k)^2 - 4 \cdot 2 \cdot (k - 3) \geq 0$$

$$k^2 - 8(k - 3) \geq 0$$

$$k^2 - 8k + 24 > 0 \quad \#$$