



Find the Domain of this Natural Log Function

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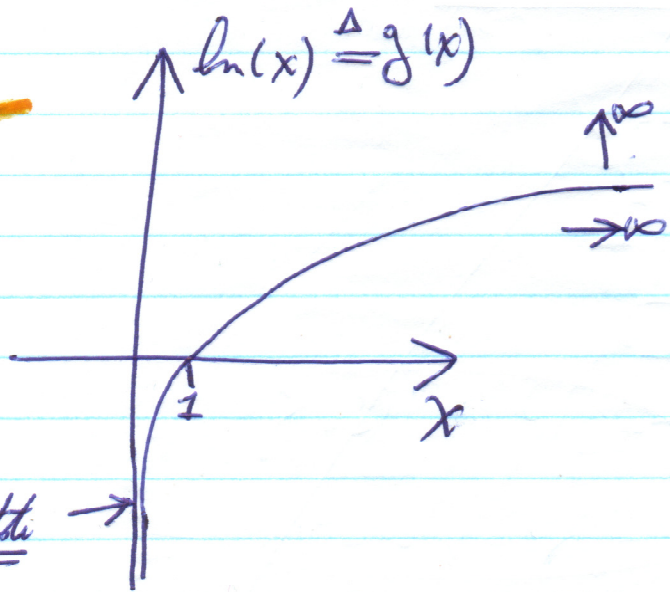
$$y = \ln(x^2 - 3x - 18)$$

1°

$$y = \ln((x+3)(x-6))$$

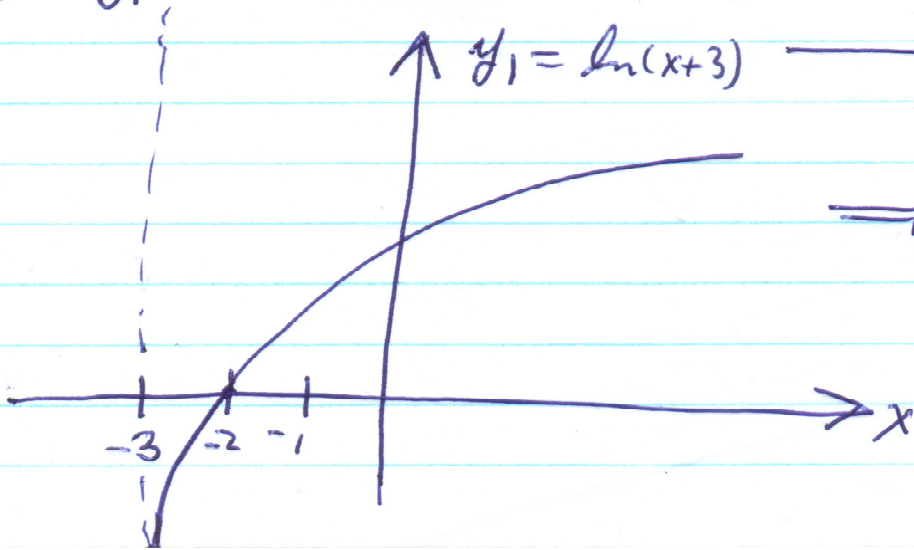
$$= \overset{y_1 =}{\ln(x+3)} + \overset{y_2 =}{\ln(x-6)}$$

2°



3°

$y_1 = g(x+3) \rightarrow$ Move to the LEFT by 3 units

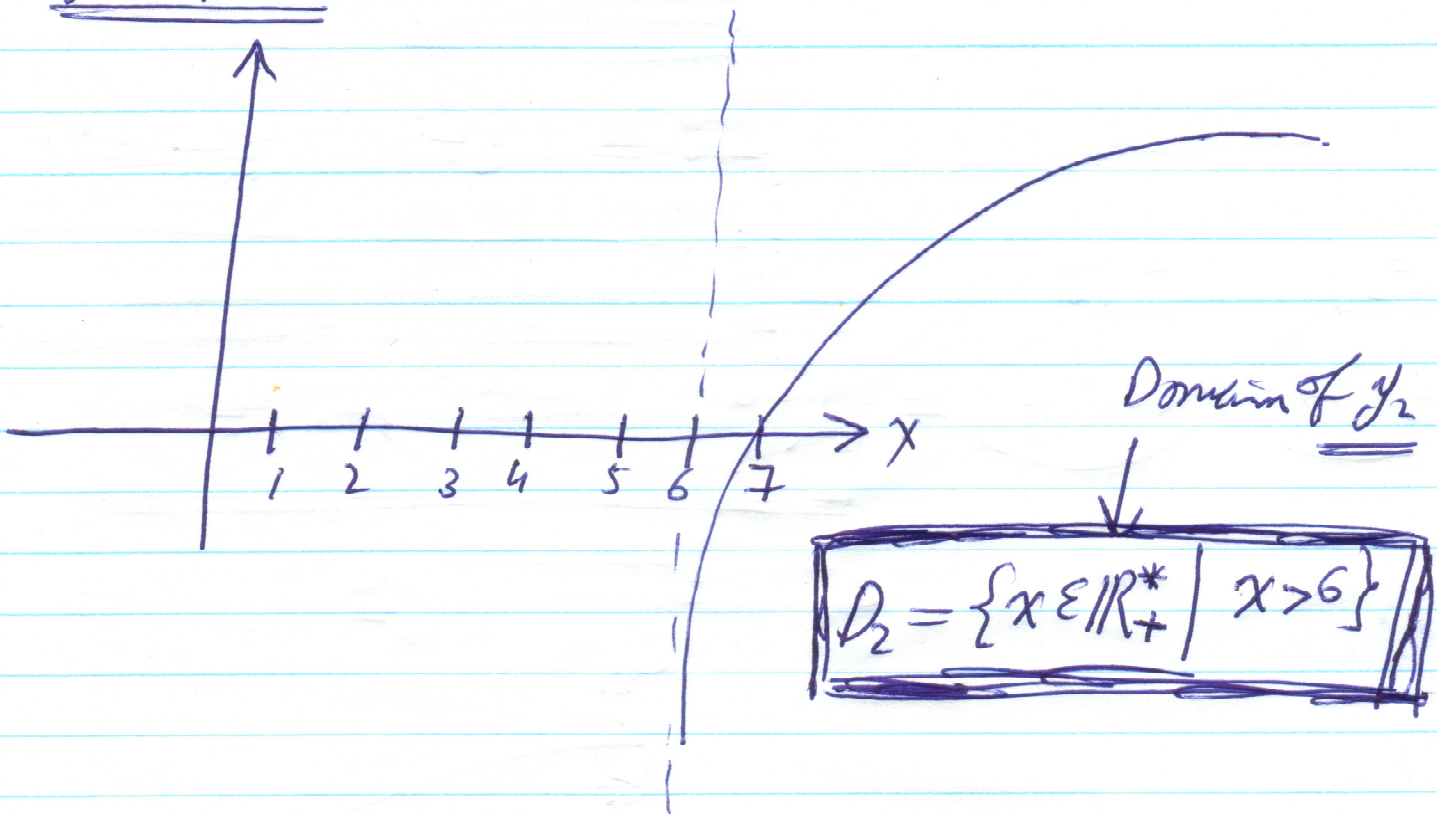


Domain \rightarrow

$$D_1 = \{x \in \mathbb{R} \mid x > -3\}$$

4°

$y_2 = f(x-6)$ → Move to the RIGHT by 6 units

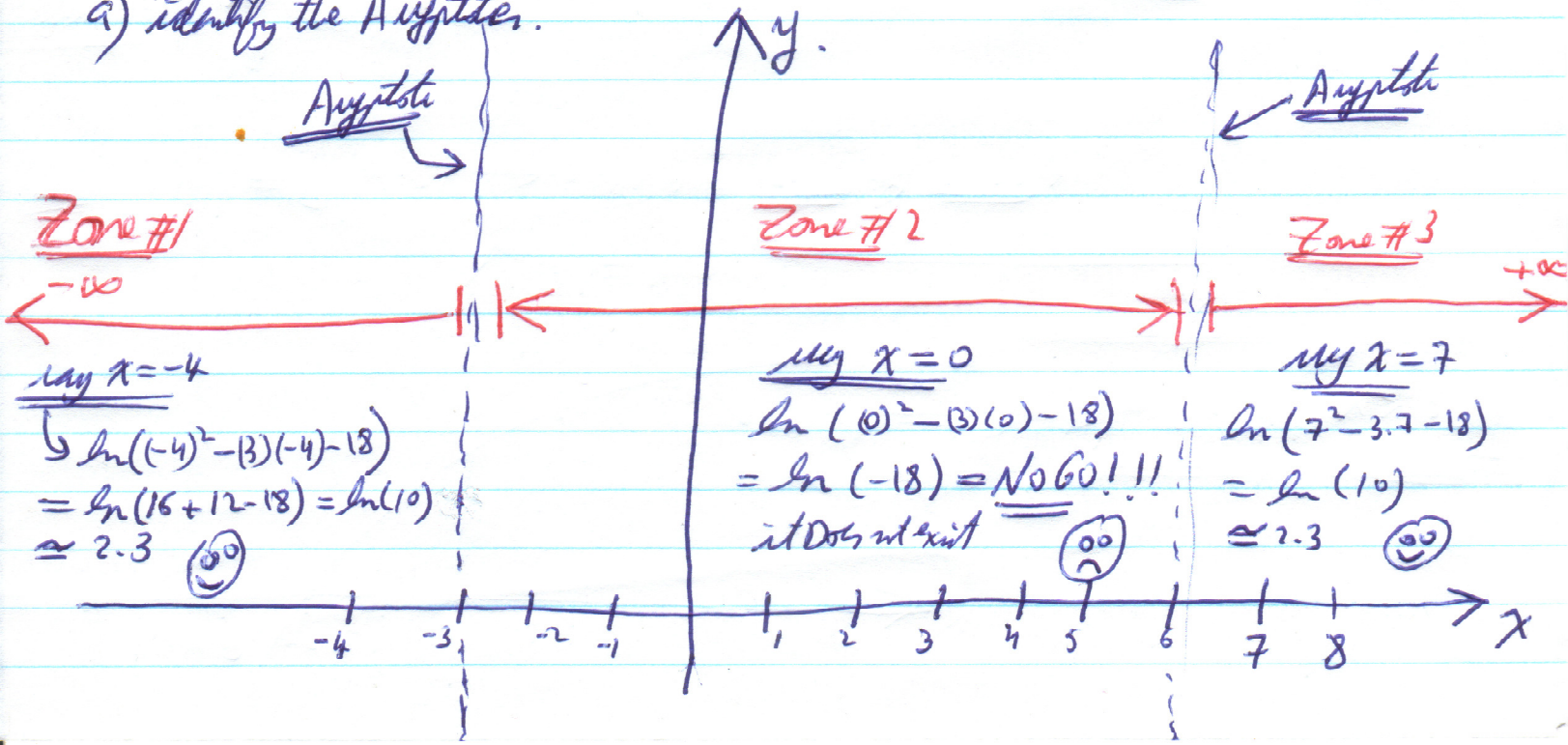


5°

$y = \ln(x+3) + \ln(x-6) = \ln(x^2 - 3x - 18)$

Now, what is this Domain??? "BE Careful" !!!

a) identify the Asymptotes.



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So the Domain for

$$y = \ln(x^2 - 3x - 18)$$

is

$$D = \{x \in \mathbb{R} \mid x < -3; x > 6\}$$
$$= (-\infty, -3) \cup (6, \infty)$$

↑
This is the Answer!

NB: So what is the moral of the story?

Looking at $y_1 = \ln(x+3)$ and $y_2 = \ln(x-6)$

(the Domain of)

and combining the result will NOT Give you the correct answer!!

You need to find the Asymptotes and go back to the main Problem.