Quiz 3

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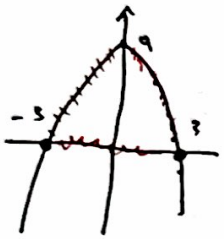
Name: KEY

1. Find the domain of the function with formula $f(x) = \ln(9 - x^2)$.

Need $9 - x^2 > 0$

$y = 9 - x^2$



From the graph of $y = 9 - x^2$ we see that $9 - x^2 > 0$ on the interval $(-3, 3)$. So

Domain $(-3, 3)$

2. Solve $\log_6(x-2) + \log_6(x+3) = 1$.

Need $\begin{cases} x-2>0 \\ \text{and} \\ x+3>0 \end{cases} \Leftrightarrow \begin{cases} x>2 \\ \text{and} \\ x>-3 \end{cases} \Leftrightarrow \boxed{x>2}$

↑ Domain of def.

$\log_6(x-2) + \log_6(x+3) = 1$

$\Leftrightarrow \log_6((x-2)(x+3)) = 1$

$\Leftrightarrow \log_6(x^2+x-6) = 1$

$\Leftrightarrow 6^{\log_6(x^2+x-6)} = 6^1$

$\Leftrightarrow x^2 + x - 6 = 6$

$\Leftrightarrow x^2 + x - 12 = 0$

$D = 1^2 - 4 \cdot 1 \cdot (-12) = 49$

$\Leftrightarrow x = \frac{-1 \pm \sqrt{49}}{2 \cdot 1} = \frac{-1 \pm 7}{2} = \begin{cases} \frac{6}{2} = 3 \checkmark & \text{in domain } 3 > 2 \\ \frac{-8}{2} = -4 \times & \text{Not in domain} \end{cases}$

Solution $x = 3$