

15.3. [ЕГЭ-2022] $3^x - \frac{702}{3^x - 1} \geq 0$

$t = 3^x > 0$

$t - \frac{702}{t-1} \geq 0$

$\frac{t(t-1) - 702}{t-1} \geq 0$

$\frac{t^2 - t - 702}{t-1} \geq 0$

$\frac{f(t)}{g(t)} \geq 0$	$\begin{cases} f(t) \geq 0 \\ g(t) > 0 \end{cases}$	> 0
$\frac{f(t)}{g(t)} > 0$	$\begin{cases} f(t) \leq 0 \\ g(t) < 0 \end{cases}$	< 0
$\frac{f(t)}{g(t)} \leq 0$	$\begin{cases} f(t) \leq 0 \\ g(t) > 0 \end{cases}$	< 0
$\frac{f(t)}{g(t)} < 0$	$\begin{cases} f(t) > 0 \\ g(t) < 0 \end{cases}$	> 0

$\begin{cases} t^2 - t - 702 \geq 0 \\ t - 1 > 0 \end{cases}$

$\begin{cases} t^2 - t - 702 \leq 0 \\ t - 1 < 0 \end{cases}$

$\begin{cases} t \leq -26, t \geq 27 \\ t > 1 \end{cases}$

$\begin{cases} -26 \leq t \leq 27 \\ t < 1 \end{cases}$

$t \geq 27$

$-26 \leq t < 1$

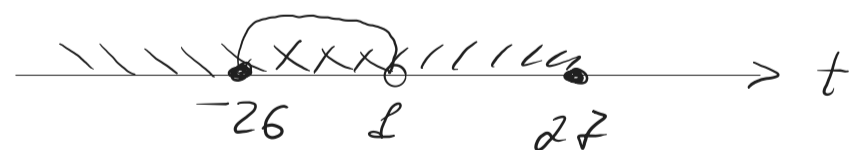
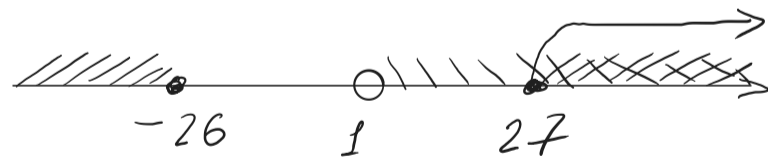
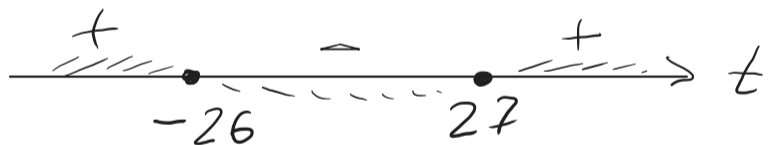
$t^2 - t - 702 \geq 0$

$\Rightarrow t^2 - t - 702 = 0$

$D = 1 + 4 \cdot 702 = 53^2$

$t_{1,2} = \frac{1 \pm 53}{2} \Rightarrow t_1 = \frac{-52}{2} = -26$

$t_2 = \frac{54}{2} = 27$



$-26 \leq t < 1$ или $t \geq 27$, но т.к. $t = 3^x$, т.е. $t > 0$, то

$\begin{cases} 0 < t < 1 \\ t \geq 27 \end{cases}$

$\begin{cases} 3^x < 1 \\ 3^x \geq 27 \end{cases}$

$\begin{cases} x < 0 \\ x \geq 3 \end{cases}$

Ответ: $(-\infty; 0) \cup [3; +\infty)$