C3 Composite Functions

$f(x) = \frac{x^2-4}{3}, \quad x \leq 0$ $\qquad\qquad\qquad g(x) = \ln|3x - 1|$

Solve $gf(x) = 0$

$gf(x) = \ln|x^2 - 5|, \qquad\qquad x \leq 0$

$\ln|x^2 - 5| = 0 \Rightarrow |x^2 - 5| = 1$

Either $x^2 - 5 = 1$ or $5 - x^2 = 1$

In the first case $x^2 = 6$ and in the second case $x^2 = 4$.

Since $gf(x)$ is defined for $x \leq 0$ the negative square root is required in each case.

$x = -\sqrt{6}$ or $x = -2$.