Computer Vision
Exercise 3

Gruppe 26
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Task 3

In each iteration the probability of selecting *only* inliers is ϵ^m. The Probability of *not only* selecting inliers is $(1 - \epsilon^m)$.

Each iteration is independent so *not* finding a selection consisting of *only* inliers after k iterations is:

$$(1 - \epsilon^m)^k$$

We call this a failure. We want this to happen with a probability not greater than q:

$$q \geq (1 - \epsilon^m)^k$$

We call the probability that it does not happen p.

$$p = (1 - q) \iff q = 1 - p$$

So we get

$$(1 - p) \geq (1 - \epsilon^m)^k$$

Now we resolve for k:

$$\begin{aligned}
& \log(1 - p) \geq \log((1 - \epsilon^m)^k) \\
\iff \quad & \log(1 - p) \geq k * \log(1 - e^m) \\
\iff \quad & \frac{\log(1 - p)}{\log(1 - \epsilon^m)} \leq k \qquad \geq \text{inverts because the log is negative}
\end{aligned}$$