Quiz #2

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Part 1

1. a
2. a
3. d
4. c
5. B

Part 2

Let's denote:

p as the probability of selecting an inlier point, which is 1 - 0.25 = 0.75

n as the number of points in each sample

k as the number of samples we need to draw to achieve our desired probability

The probability that a single sample contains only inliers is p^n.

The probability that a single sample contains at least one outlier is 1 - p^n.

The probability that all k samples contain at least one outlier is (1 - p^n)^k.

We want the probability of having at least one sample of all inliers to be 25%, which means the probability of having all samples contain at least one outlier should be 75%.

Thus, we set up the equation: (1 - p^n)^k = 0.75

Substituting p = 0.75: (1 - 0.75^n)^k = 0.75

To solve for k, take the natural logarithm of both sides: ln((1 - 0.75^n)^k) = ln(0.75)

Using the logarithm power rule, ln(a^b) = b ln(a), we get: k ln(1 - 0.75^n) = ln(0.75)

Solving for k: k = ln(0.75) / ln(1 - 0.75^n)

Thus, the number of samples needed to ensure with 25% probability that at least one sample contains only inliers is: k = ln(0.75) / ln(1 - 0.75^n)