Machine learning exercise
NO.1 Probability practice
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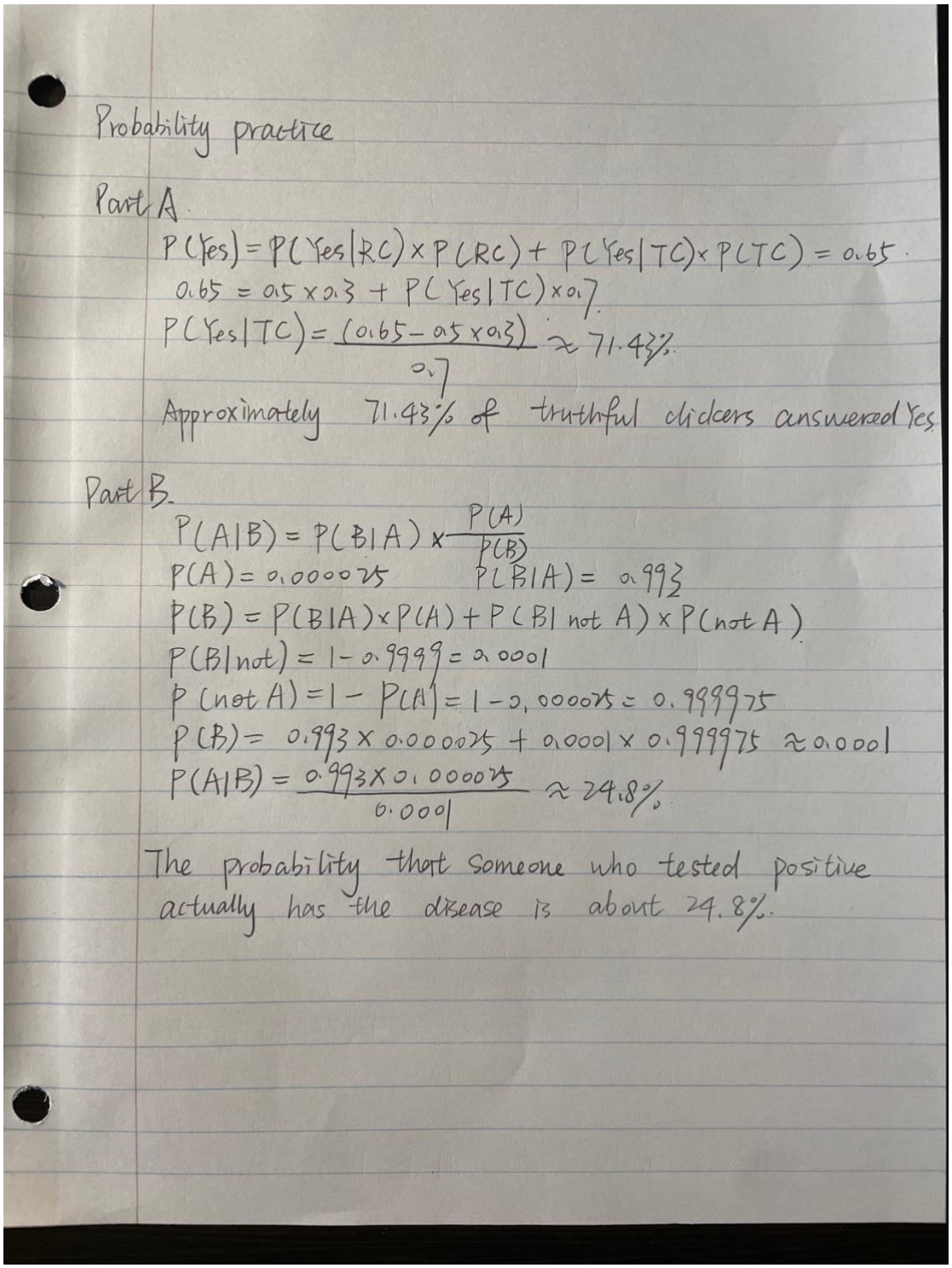

Probability practice

Part A.

$P(Yes) = P(Yes|RC) \times P(RC) + P(Yes|TC) \times P(TC) = 0.65$.

$0.65 = 0.5 \times 0.3 + P(Yes|TC) \times 0.7$.

$P(Yes|TC) = \frac{(0.65 - 0.5 \times 0.3)}{0.7} \approx 71.43\%$.

Approximately 71.43% of truthful clickers answered Yes.

Part B.

$P(A|B) = P(B|A) \times \frac{P(A)}{P(B)}$

$P(A) = 0.000025$ $P(B|A) = 0.993$

$P(B) = P(B|A) \times P(A) + P(B|\text{not } A) \times P(\text{not } A)$

$P(B|\text{not}) = 1 - 0.9999 = 0.0001$

$P(\text{not } A) = 1 - P(A) = 1 - 0.000025 = 0.999975$

$P(B) = 0.993 \times 0.000025 + 0.0001 \times 0.999975 \approx 0.0001$

$P(A|B) = \frac{0.993 \times 0.000025}{0.0001} \approx 24.8\%$.

The probability that someone who tested positive actually has the disease is about 24.8%.