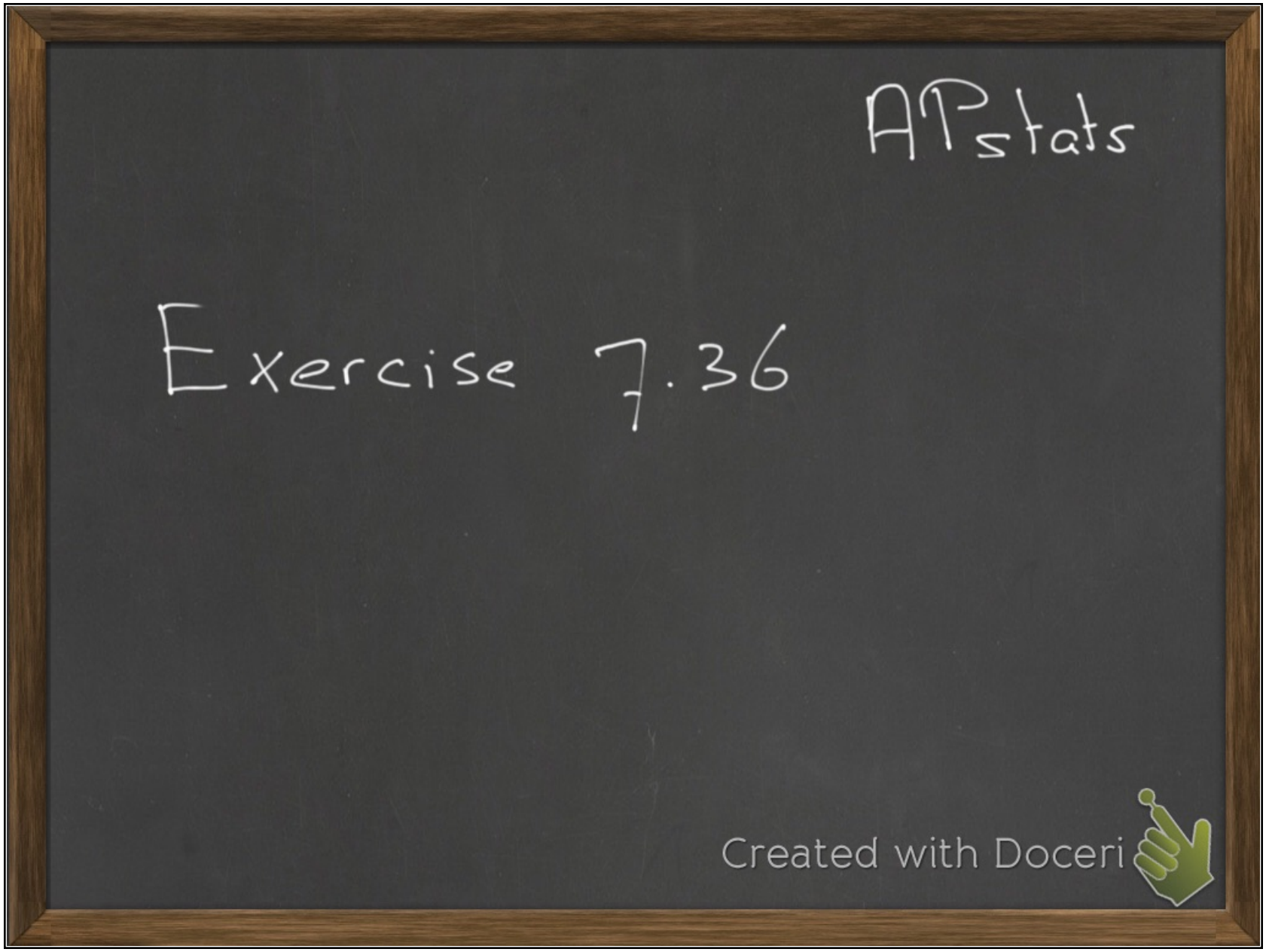
APstats
Exercise 7.36
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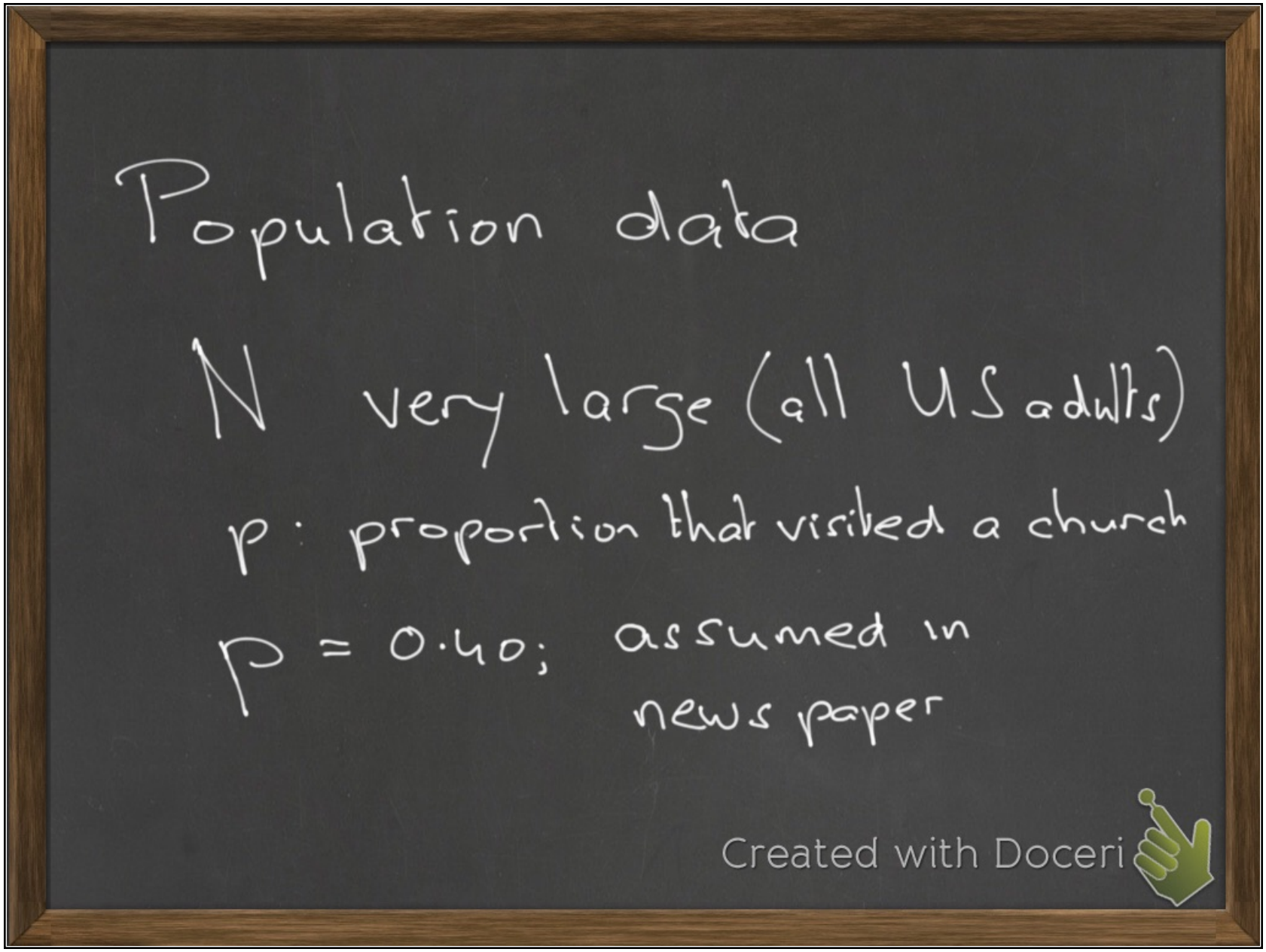
Population data
N very large (all US adults)
p: proportion that visited a church
p = 0.40; assumed in news paper
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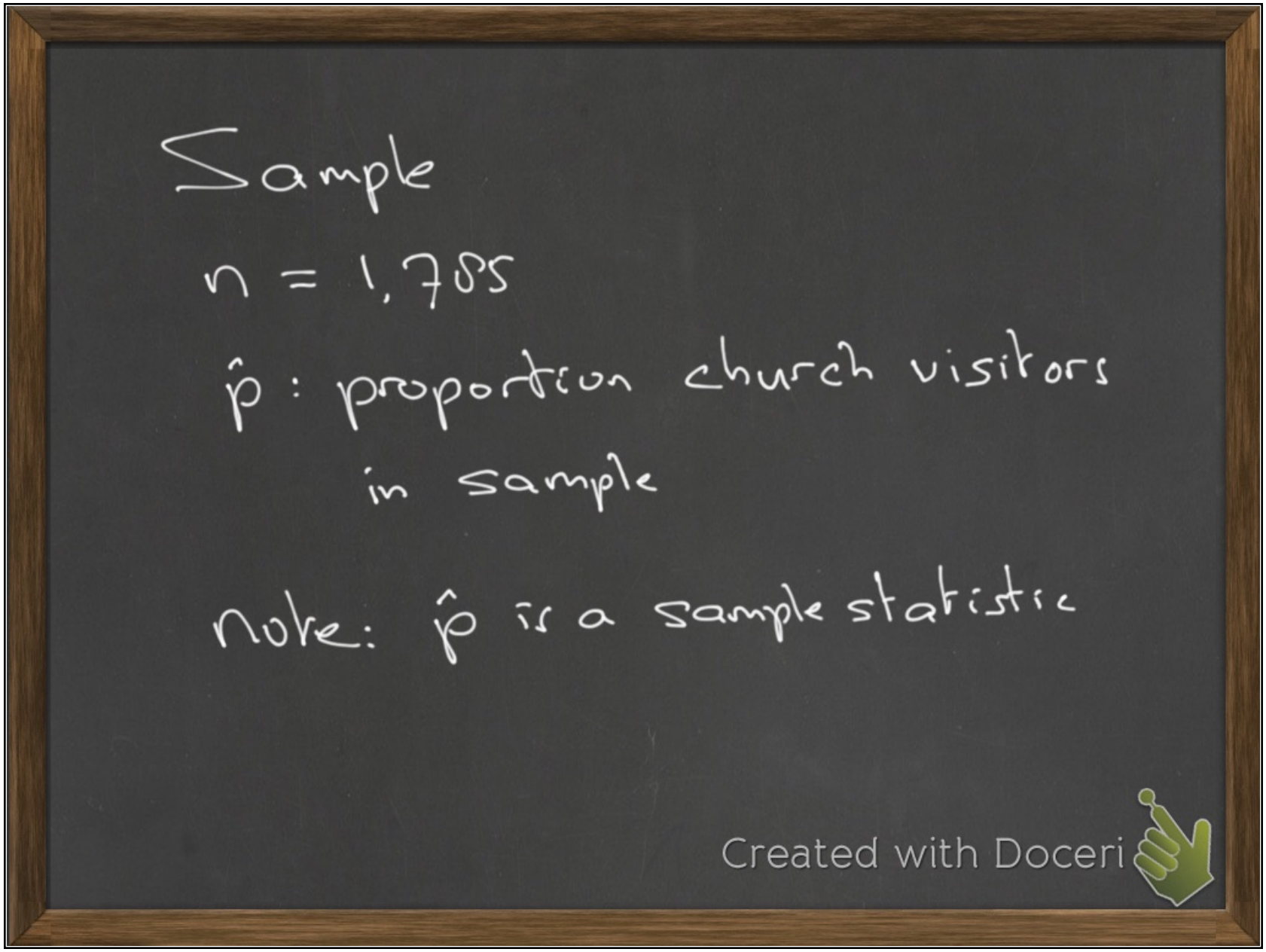
Sample
n = 1,785
p̂ : proportion church visitors in sample
Note: p̂ is a sample statistic
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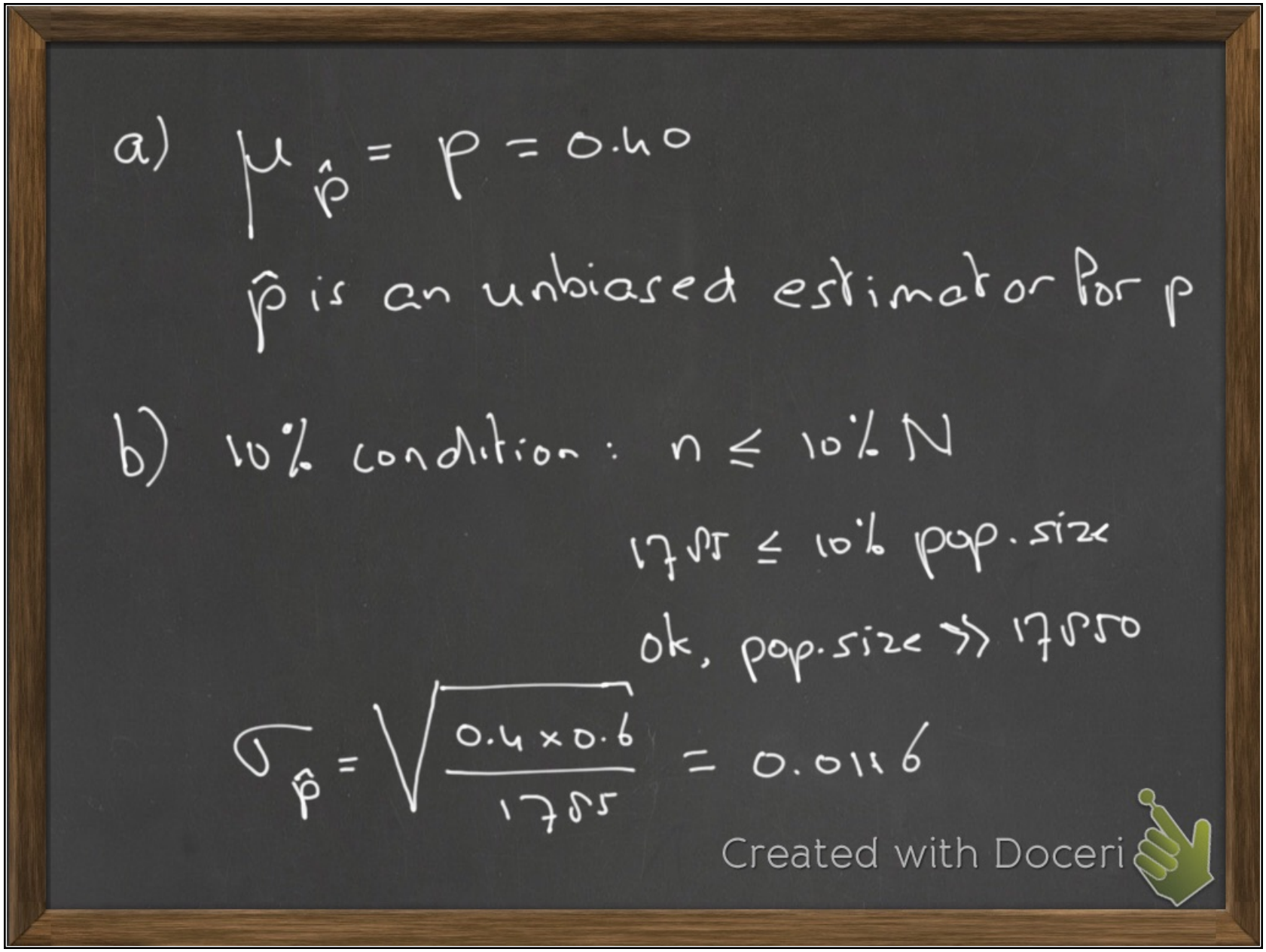
a) $\mu_{\hat{p}} = p = 0.40$
$\hat{p}$ is an unbiased estimator for p
b) 10% condition: $n \leq 10\%\ N$
1755 ≤ 10% pop. size
ok, pop. size ≫ 17550
$\sigma_{\hat{p}} = \sqrt{\frac{0.4 \times 0.6}{1755}} = 0.0116$
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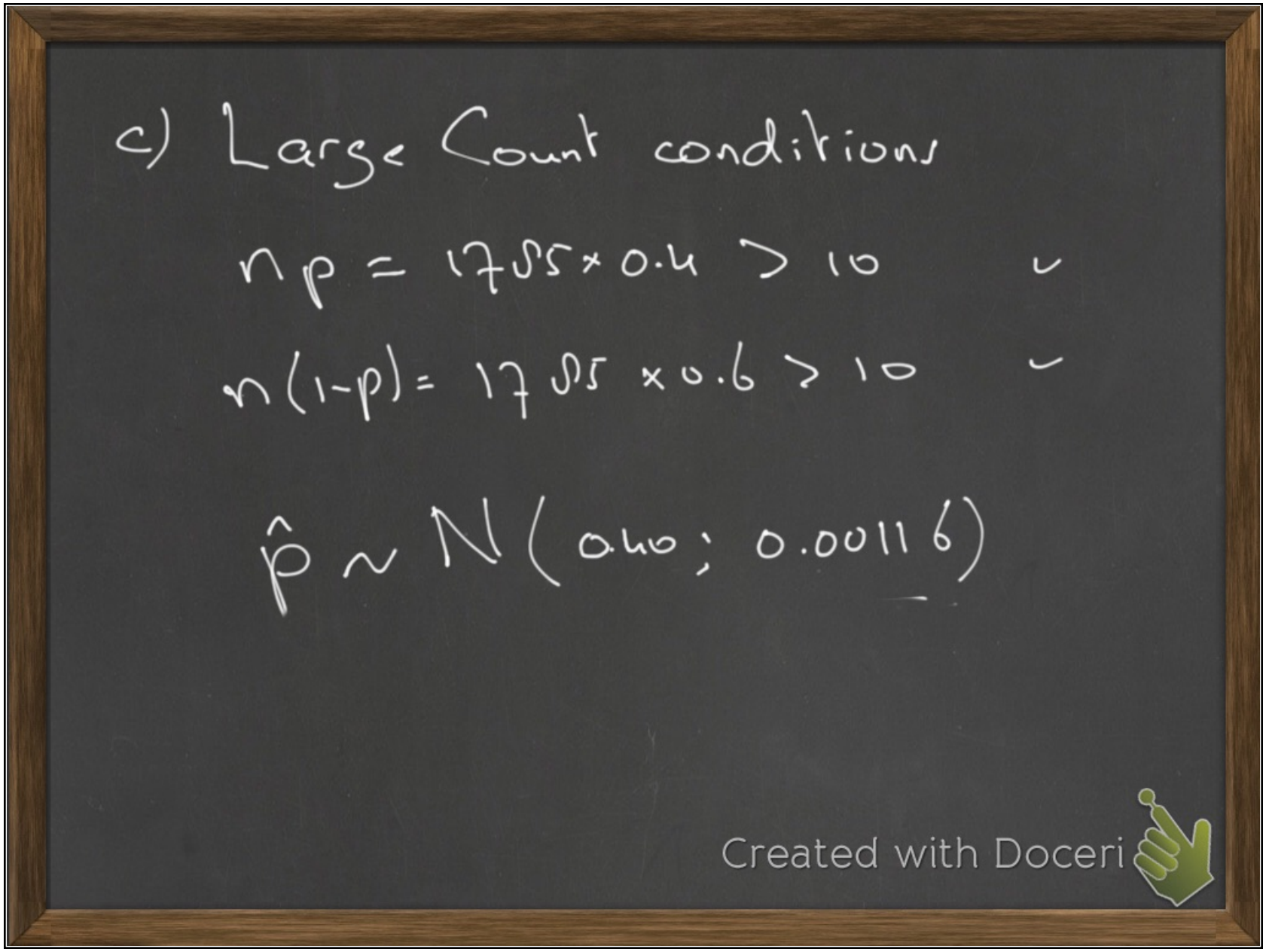
c) Large Count conditions
$np = 1755 \times 0.4 > 10$ ✓
$n(1-p) = 1755 \times 0.6 > 10$ ✓
$\hat{p} \sim N(0.40; 0.00116)$
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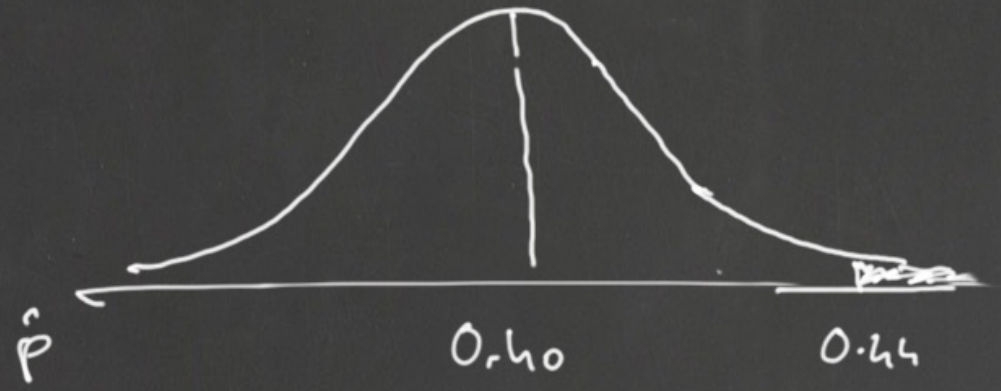
d) sampling distr. of $\hat{p}$



$$P(\hat{p} \geq 0.44) = P(Z \geq 3.45) = 0.0003$$

$\Rightarrow$ if $p = 0.40$ the sample result is very, very unlikely $\Rightarrow$ reject the assumption