Form B

1. (b) and (e) only

3. (a) 99.7% (b) When $np \geq 10$ and $n(1-p) \geq 10$

4. (c) It's an estimator of μ, the population mean difference in corneal thickness between an eye with glaucoma and a healthy eye.

(f) A bootstrap sample here satisfies these criteria

- draw from the original with replacement
- obtain a sample of the same size as original

(g) A 99% bootstrap percentile interval should extend from the 0.5-percentile to the 99.5-percentile. With 1000 points, these percentiles are 5 away from the two ends. Estimating, that is approximately $(-5.4, 5.3)$.

(h) It mostly seems so. We likely

- have an SRS (not an iid), but $n = 10$ is a very small sample
- have a normal population (biological measurements, normal quantile plot mostly straight)

(i)
$$0.1 \pm (3.2498)\frac{6.7239}{\sqrt{10}}, \quad \text{or} \quad (-6.81, 7.01)$$

5. (a) qnorm(0.08)

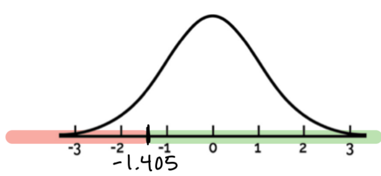
(b) $\hat{p} = \frac{33}{100} = 0.33$, $E(\hat{p}) = p = 0.35$, $Var(\hat{p}) = \sqrt{\frac{p(1-p)}{n}} = \sqrt{\frac{(.35)(.65)}{100}} = 0.047697$

$$\Rightarrow Z = \frac{\hat{p} - p}{\sqrt{p(1-p)/n}} = \frac{0.33 - 0.35}{0.047697} \doteq -0.4193$$

(c) pnorm(−0.4193) or pbinom(33, 100, 0.35)

(d) (iii)

(e) The rejection region is $Z < -1.405$, and so $Z = -0.4193$ is in the nonrejection region. We fail to reject H_0.



(f) We reject H_0 when the Z-score

$$Z = \frac{0.33 - 0.35}{\sqrt{(.35)(.65)/n}} < -1.4051 \Rightarrow \left(\frac{0.02}{1.4051}\right)^2 > \frac{(0.35)(0.65)}{n}$$

$$\Rightarrow n > \frac{(0.35)(0.65)}{(0.02/1.4051)^2} = 1122.89$$

$\boxed{\text{So } n = 1123 \text{ is minimal.}}$