

## Homework Solutions

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#### Exercise 6

Part (b) says to perform the test, which means to show all seven steps. However, part (a) is Step 1 and part (c) is Step 7. So I will show Steps 2 - 6 in part (b).

- (a) Let  $\mu$  be the mean lifetime of mice 30% of whose diet is replaced by vitamins and protein. The hypotheses are

$$H_0 : \mu = 32$$

$$H_1 : \mu > 32$$

- (b) Now we will do Steps 2 through 6.

2.  $\alpha = 0.025$

3. The test statistic is

$$z = \frac{\bar{x} - \mu_0}{\sigma/\sqrt{n}}.$$

4. The value of the test statistic is

$$\begin{aligned} z &= \frac{38 - 32}{5.8/\sqrt{64}} \\ &= \frac{6}{0.725} \\ &= 8.276. \end{aligned}$$

5. The  $p$ -value is

$$\text{normalcdf}(8.276, \text{E99}) = 6.449 \times 10^{-17}.$$

6. Reject  $H_0$  (because the  $p$ -value is less than  $\alpha$ ).

- (c) The mean lifetime of the mice with the special diet is greater than 32 months.