1. Suppose a new production system will be implemented if a hypothesis test supports the conclusion that the new system increases production. Current system mean = 400

The appropriate null and alternative hypotheses in this case are?

a. Ho: $\mu \geq 400$ Ha: $\mu < 400$

b. Ho: $\mu \leq 400$ Ha: $\mu > 400$

c. Ho: $\mu = 400$ Ha: $\mu \neq 400$

d. Ho: $\mu = 0$ Ha: $\mu \neq 0$

e. Ho: $\mu \neq 400$ Ha: $\mu = 400$

Solution

The conclusion that the new system increases production means that the system mean is bigger than 400.

Answer: b. Ho: $\mu \leq 400$ Ha: $\mu > 400$.

2. The new system was monitored for 40 hours and showed a mean production rate of 410 units per hour. Based on prior experience, a population standard deviation of 50 units can be used. Assume a .05 level of significance.

What is the critical value of the test statistic?

a. z = 1.96

b. t = 1.26

c. z = 1.26

d. t = 1.685

e. z = 1.64

Solution

We know population standard deviation and sample size is bigger than 30. So, we use z-distribution.

The one tailed z-critical for a .05 level of significance is 1.64.

Answer: e. z = 1.64.

3. What is the hypothesis test conclusion?

a. Do not reject Ho.

b. The test is inconclusive.

c. Reject Ho.

d. Reject Ho.

e. Do not reject Ho.

Solution

Test statistic $z = 1.26$ is less than z-critical (1.64). Thus, we don't reject the null hypothesis at a .05 level of significance.

Answer: a. and e. Do not reject Ho.

4. The calculated value of the test statistic is

a. z = 1.64.

b. z = 1.96.

c. t = 1.685.

d. t = 1.26.

e. z = 1.26.

Solution

$$z = \frac{\bar{x} - \mu_0}{\frac{\sigma}{\sqrt{n}}} = \frac{410 - 400}{\frac{50}{\sqrt{40}}} = 1.26.$$

Answer: e. z = 1.26.