Example 1

A hypothesis test is to be performed to determine whether the mean waiting time during peak hours for customers in a supermarket is different from the previous mean waiting time of 8.2 minutes. Previous experience indicates that the waiting time follows a normal distribution with standard deviation equal 3.8 minutes. To test the hypothesis, a random sample of 25 customers will be selected yields mean $\bar{x} = 9.75$.. **Answer the questions 1 to 8.**

Question 1:
The null and alternative hypotheses are...

(A) $H_0 : \mu \geq 8.2$ & $H_1 : \mu < 8.2$	(B) $H_0 : \mu = 8.2$ & $H_1 : \mu \neq 8.2$
(C) $H_0 : \mu \leq 8.2$ & $H_1 : \mu > 8.2$	(D) $H_0 : \bar{X} \leq 8.2$ & $H_1 : \bar{X} > 8.2$

Question 2:
This hypothesis test is classifies as...

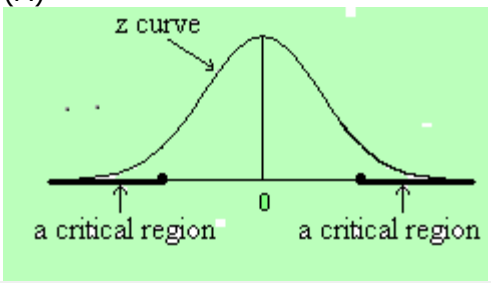
(A) Right-tailed	(B) Two-tailed
(C) Multi-tailed	(D) left-tailed

Question 3:
The appropriate test statistic is...

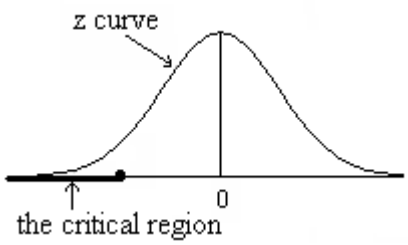
(A) $Z = \dfrac{\bar{X} - \mu}{S/\sqrt{n}}$	(B) $Z = \dfrac{\bar{X} - \mu}{\sigma/\sqrt{n}}$
(C) $T = \dfrac{\bar{X} - \mu}{S/\sqrt{n}}$	(D) $F = \dfrac{\bar{X} - \mu}{\sigma/\sqrt{n}}$

Question 4:
The critical region is best described by figure....

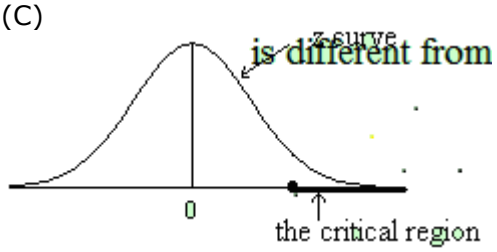
(A)



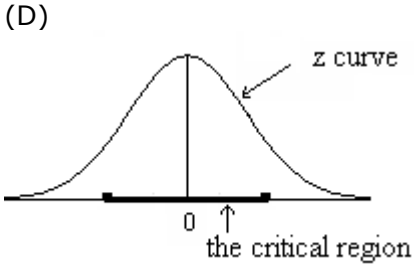
(B)



(C)



(D)



Question 5:

With significance level equal 0.10, the decision criterion for the hypothesis test in terms of the computed value of the test statistic is....

(A) Reject H_0 if z_{stat} < -1.645	(B) Reject H_0 if z_{stat} > 1.96
(C) Reject H_0 if Z_{stat} > 1.645 or $Z_{stat} < -1.645$	(D) Reject H_0 if z_{stat} > 1.645

Question 6:

The computed value of our test statistic is....

(A) -2.04	(B) 3.98	(C) 2.04	(D) 0.54

Solution:

$$z_{stat} = \frac{9.75 - 8.2}{3.8/\sqrt{25}} = 2.04$$

Question 7:

The decision would be to....

(A) Cannot be determined
(B) Do not reject the null hypothesis.
(C) Reject the null hypothesis.
(D) Reject the alternative hypothesis.

Question 8:

Suppose that in fact the waiting time is increased to 9 minutes ($\mu_1 = 9.9$), then the decision has been made is...

(A) Committing Type I error	(B) Committing Type II error
(C) Correct decision($1-\alpha$)	(D) Correct decision($1-\beta$)

End of example 1

Example 2

It assumed from last experience that 75% of sports viewers are male. A famous sport newspaper reports that this proportion is different from 0.75. A random sample of 400 season ticket holders reveals that 352 are male. We wish to test the above hypothesis. **Answer the questions 1 to 9.**

Question 1:

The null and alternative hypotheses are...

(A) $H_0: P \leq 0.75$ & $H_1: P > 0.75$	(B) $H_0: \pi < 0.75$ & $H_1: \pi \geq 0.75$
(C) $H_0: \pi \leq 0.75$ & $H_1: \pi > 0.75$	(D) $H_0: \pi = 0.75$ & $H_1: \pi \neq 0.75$

Question2:

This hypothesis test is classifies as...

(A) Two-tailed	(B) Right-tailed
(C) Opposite-tailed	(D) left-tailed

Question 3:

The appropriate test statistic is...

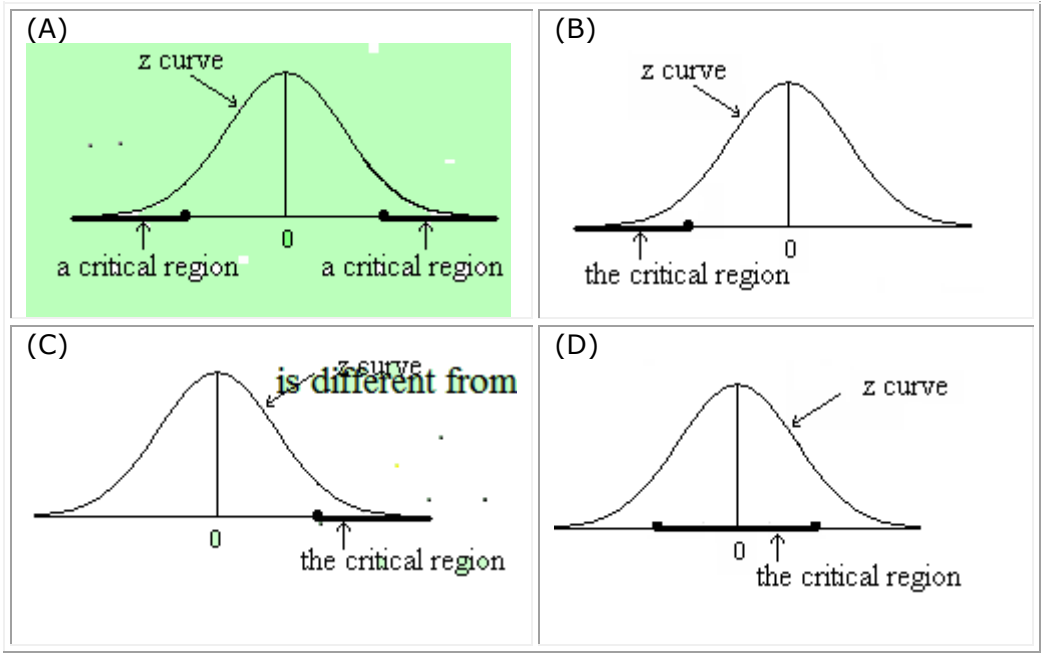
(A) $Z = \dfrac{P - \pi}{\sqrt{\pi(1-\pi)/n}}$	(B) $T = \dfrac{\bar{X} - \mu}{S/\sqrt{n}}$
(C) $Z = \dfrac{\bar{X} - \mu}{\sigma/\sqrt{n}}$	(D) $\chi^2 = \dfrac{P - \pi}{\sqrt{\pi(1-\pi)/n}}$

Question 4:

With significance level equal 0.10, the decision criterion for the hypothesis test in terms of the computed value of the test statistic (Z_{stat}) is....

(A) Reject H_0 if z_{stat} < -1.645	(B) Reject H_0 if z_{stat} > 1.96
(C) Reject H_0 if Z_{stat} > 1.645 or $Z_{stat} < -1.645$	(D) Reject H_0 if z_{stat} > 1.645

Question 5:
With level of significance 5%, the critical region is best described by figure....



Question 6:
The computed value of our test statistic is....

(A) 0.01	(B) 5.99	(C) 0.23	(D) -0.01

Solution:

$$z_c = \frac{350/400 - 0.75}{\sqrt{(.75)(.25)/400}} = \frac{0.875 - 0.75}{0.0217} = \frac{0.88 - 0.75}{0.0217} = 5.99$$

Question 7:
The decision would be to....

(A) Do not Reject the null hypothesis
(B) Cannot be determined.
(C) Reject the null hypothesis.
(D Reject the alternative hypothesis.

Question 8:
Suppose that in fact the true proportion is 0.85, then the decision has been made is... α

(A) Rejecting the true hypothesis(α) type1 error	(B)Do not Rejecting the false hypothesis (β) type11 error.
(C) Do not rejecting the true hypothesis($1-\alpha$)Correct decision	(D) Rejecting the false hypothesis($1-\beta$)Correct decision

Question 9:
Suppose that in fact the true proportion is 0.74, then the decision has been made is...

(A) Rejecting the true hypothesis(α) type1 error	(B)Do not Rejecting the false hypothesis (β) type11 error.
(C) Do not rejecting the true hypothesis($1-\alpha$)Correct decision	(D) Rejecting the false hypothesis($1-\beta$)Correct decision

End of example 2

Example 3

Question 1:
A 95% confidence interva is $12 < \mu < 17$ null hypothesis is $H_0: \mu = 10$
$H_1: \mu \neq 10$

What is the decision?

(A) Reject the null hypothesis.
(B) Do not Reject the null hypothesis.
(C) Can not be determined
(D) Reject the alternative hypothesis.

Question2: A 95% confidence interval is $0{\cdot}85 \leq \pi \leq 0.91$. The null hypothesis is
$H_0: \pi = 0.88$
$H_1: \pi \neq 0.88$

What is the decision?

(A) Reject the null hypothesis.
(B) Do not Reject the null hypothesis.
(C) Cannot be determined
(D) Do not Reject the alternative hypothesis.

End of example 3