# PRINTABLE VERSION

## Quiz 14

# You scored 100 out of 100

**Question 1**

Your answer is CORRECT.

State the type of hypothesis test to be used in the following situation:

Hippocrates magazine states that 37 percent of all Americans take multiple vitamins regularly. Suppose a researcher surveyed 750 people to test this claim and found that 290 did regularly take a multiple vitamin. Is this sufficient evidence to conclude that the actual percentage is different from 37%?

$$H_0: \ p = .37 \qquad \hat{p} = \frac{290}{750}$$

$$H_a: \ p \neq .37$$

*One sample z test*

**a)** ⦿ One Sample Z Test for Proportions

**b)** ◯ $\chi^2$ Goodness of Fit Test

**c)** ◯ Two Sample T Test for Means

**d)** ◯ $\chi^2$ Test for Independence

**e)** ◯ Matched Pairs T Test

**f)** ◯ One Sample T Test for Means

**g)** ◯ Two Sample Z Test for Proportions

**h)** ◯ One Sample Z Test for Means

**Question 2**

Your answer is CORRECT.

State the type of hypothesis test to be used in the following situation:

Solid fats are more likely to raise blood cholesterol levels than liquid fats. Suppose a nutritionist analyzed the percentage of saturated fat for a sample of 6 brands of stick margarine (solid fat) and for a sample of 6 brands of liquid margarine and obtained the following results:

| Stick  | 25.8 | 26.9 | 26.2 | 25.3 | 26.7 | 26.1 |
|--------|------|------|------|------|------|------|
| Liquid | 16.9 | 17.4 | 16.8 | 16.2 | 17.3 | 16.8 |

$\}$ find $\overline{X}_1$ $\overline{X}_2$

$s_1$ $s_2$

↓

statistic (2 sample)

Is there a significant difference in the average amount of saturated fat in solid and liquid fats? Assume the population is normally distributed.

*no known pop sd => use $t^*$*

**a)** ○ Two Sample T Test for Means

**b)** ○ $\chi^2$ Goodness of Fit Test

**c)** ○ Two Sample Z Test for Proportions

**d)** ○ $\chi^2$ Test for Independence

**e)** ○ Matched Pairs T Test

**f)** ○ One Sample T Test for Means

**g)** ○ One Sample Z Test for Proportions

**h)** ○ One Sample Z Test for Means

## Question 3

### Your answer is CORRECT.

State the type of hypothesis test to be used in the following situation:

In a certain city, there are about one million eligible voters. A simple random sample of size 10,000 was chosen to study the relationship between gender and participation in the last election. The results were:

*$n = 10,000$*

|              | Men  | Women |
|--------------|------|-------|
| Voted        | 2792 | 3591  |
| Didn't Vote  | 1486 | 2131  |

*4278      5722*

Is there a difference in the proportion of men who voted and women who voted?

*$H_0: P_1 = P_2$*
*$H_a: P_1 \neq P_2$*
*two sample 2-test*

**a)** ○ One Sample Z Test for Proportions

**b)** ● Two Sample Z Test for Proportions

**c)** ○ $\chi^2$ Test for Independence

**d)** ○ Matched Pairs T Test

**e)** ○ One Sample T Test for Means

**f)** ○ Two Sample T Test for Means

**g)** ○ One Sample Z Test for Means

**h)** ○ $\chi^2$ Goodness of Fit Test

## Question 4

# Your answer is CORRECT.

In a certain city, there are about one million eligible voters. A simple random sample of size 10,000 was chosen to study the relationship between gender and participation in the last election. The results were:

|  | Men | Women |
|---|---|---|
| Voted | 2633 | 3499 |
| Didn't Vote | 1444 | 2424 |

If we are testing for a relationship between gender and participation in the last election, what is the test statistic?

```
row1=c(2633,3499)
> row2=c(1444,2424)
> data.table=rbind(row1,row2)
> data.table
     [,1] [,2]
row1 2633 3499
row2 1444 2424
> chisq.test(data.table)

 Pearson's Chi-squared test
with Yates' continuity
 correction

data:  data.table
X-squared = 30.645, df = 1,
p-value = 3.099e-08
```

**a)** ○ $\chi^2 = 24.438$

**b)** ○ $z = -13.340$

**c)** ◉ $\chi^2 = 30.876$

**d)** ○ $z = -17.682$

**e)** ○ $\chi^2 = 46.314$

## Question 5

# Your answer is CORRECT.

In a certain city, there are about one million eligible voters. A simple random sample of size 10,000 was chosen to study the relationship between gender and participation in the last election. The results were:

|  | Men | Women |
|---|---|---|
| Voted | 2555 | 3544 |
| Didn't Vote | 1566 | 2335 |

If we are testing for a relationship between gender and participation in the last election, what is the p-value and decision at the 5% significance level? Select the [p-value, Decision to Reject ($RH_0$) or Failure to Reject ($FRH_0$)]

```
row1=c(2555,3544)
> row2=c(1566,2335)
> data.table=rbind(row1,row2)
> data.table
    [,1] [,2]
row1 2555 3544
row2 1566 2335
> data.table=rbind(row1,row2)
> chisq.test(data.table)

 Pearson's Chi-squared test
with Yates' continuity
 correction

data:  data.table
X-squared = 2.9308, df = 1,
p-value = 0.0869
```

a) ⦿ [p-value = 0.083, FRH0]

b) ○ [p-value = 0.391, RH0]

c) ○ [p-value = 0.083, RH0]

d) ○ [p-value = 0.391, FRH0]

e) ○ [p-value = 0.042, RH0]

## Question 6

### Your answer is CORRECT.

The Blue Diamond Company advertises that their nut mix contains (by weight) 40% cashews, 15% Brazil nuts, 20% almonds and only 25% peanuts. The truth-in-advertising investigators took a random sample (of size 20 lbs) of the nut mix and found the distribution to be as follows: 6 lbs of Cashews, 5 lbs of Brazil nuts, 8 lbs of Almonds and 1 lbs of Peanuts. At the 0.05 level of significance, is the claim made by Blue Diamond true?
Select the [p-value, Decision to Reject ($RH_0$) or Failure to Reject ($FRH_0$)].

```
chisq.test(c(6,5,8,1),p=c(.40,.15,.20,.25))

 Chi-squared test for given probabilities

data:  c(6, 5, 8, 1)
X-squared = 9.0333, df = 3, p-value = 0.02885
```

a) ○ [p-value = 0.003, FRH0]

b) ⦿ [p-value = 0.029, RH0]

c) ○ [p-value = 0.014, RH0]

d) ○ [p-value = 0.029, FRH0]

e) ○ [p-value = 0.003, RH0]

## Question 7

### Your answer is CORRECT.

Quart cartons of milk should contain at least 32 ounces. A sample of 20 cartons contained the following amounts in ounces. Does sufficient evidence exist to conclude the mean amount of milk in cartons is less than 32 ounces at the 5% significance level?
The data is:   (32.8, 27.4, 27.8, 31.1, 28.5, 28.3, 32.3, 32.6, 32.3, 32.3, 28.6, 27.6, 28.2, 32.1, 32.6, 32.3, 28.6, 31.6, 31.5, 31.6)
Select the [p-value, Decision to Reject ($RH_0$) or Failure to Reject ($FRH_0$)].

```
num7=c(32.8,27.4,27.8,31.1,28.5,28.3,32.3,32.6,32.3,32.3,28.
6,27.6,28.2,32.1,32.6,32.3,28.6,31.6,31.5,31.6)
> mean(num7)
[1] 30.505
> sd(num7)
[1] 2.052848
```

a) ○ [p-value = 0.998, FRH0]

**b)** ⚪ [p-value = 0.001, RH0]

**c)** 🔘 [p-value = 0.002, RH0]

**d)** ⚪ [p-value = 0.998, RH0]

**e)** ⚪ [p-value = 0.002, FRH0]

## Question 8

**Your answer is CORRECT.**

Hippocrates magazine states that 34 percent of all Americans take multiple vitamins regularly. Suppose a researcher surveyed 750 people to test this claim and found that 273 did regularly take a multiple vitamin. Is this sufficient evidence to conclude that the actual percentage is different from 34% at the 5% significance level?
Select the [p-value, Decision to Reject ($RH_0$) or Failure to Reject ($FRH_0$)].

**a)** ⚪ [p-value = 0.165, RH0]

**b)** ⚪ [p-value = 0.083, FRH0]

**c)** ⚪ [p-value = 0.083, RH0]

**d)** 🔘 [p-value = 0.165, FRH0]

**e)** ⚪ [p-value = 0.215, FRH0]

## Question 9

**Your answer is CORRECT.**

A national computer retailer believes that the average sales are greater for salespersons with a college degree. A random sample of 35 salespersons with a degree had an average weekly sale of $3666 last year, while 32 salespersons without a college degree averaged $3344 in weekly sales. The standard deviations were $468 and $642 respectively. Is there evidence at the 5% level to support the retailer's belief?
Select the [p-value, Decision to Reject ($RH_0$) or Failure to Reject ($FRH_0$)].

**a)** ⚪ [p-value = 0.015, RH0]

**b)** ⚪ [p-value = 0.007, RH0]

**c)** 🔘 [p-value = 0.013, RH0]

**d)** ○ [p-value = 0.013, FRH0]

**e)** ○ [p-value = 0.015, FRH0]

## Question 10

# Your answer is CORRECT.

The community hospital is studying its distribution of patients. A random sample of 320 patients presently in the hospital gave the following information:

| Type of Patient | Old Rate of Occurrences | Present Number of Occurrences |
|---|---|---|
| Maternity Ward | 20% | 75 |
| Cardiac Ward | 32% | 95 |
| Burn Ward | 10% | 30 |
| Children's Ward | 15% | 47 |
| All Other Wards | 23% | 73 |

Test the claim at the 5% significance level that the distribution of patients in these wards has not changed.
Select the [p-value, Decision to Reject ($RH_0$) or Failure to Reject ($FRH_0$)].

chisq.test(c(75,95,30,47,73),p=c (.20,.32,.10,.15,.23))

 **Chi-squared test for given probabilities**

data:  c(75, 95, 30, 47, 73)
X-squared = 2.5761, df = 4,
p-value = 0.6311

**a)** ○ [p-value = 0.108, RH0]

**b)** ○ [p-value = 0.631, RH0]

**c)** ◉ [p-value = 0.631, FRH0]

**d)** ○ [p-value = 0.316, RH0]

**e)** ○ [p-value = 0.108, FRH0]

## Question 11

# Your answer is CORRECT.

In a experiment on relaxation techniques, subject's brain signals were measured before and after the relaxation exercises with the following results:

| Person | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Before | 38.8 | 42.6 | 41.8 | 38.2 | 38.7 |
| After | 35.7 | 37.3 | 43.8 | 40.2 | 40.7 |

Is there sufficient evidence to suggest that the relaxation exercise slowed the brain waves? Assume the population is normally distributed.

Select the [p-value, Decision to Reject ($RH_0$) or Failure to Reject ($FRH_0$)].

a) ◯ [p-value = 0.773, RH0]

b) ◯ [p-value = 0.773, FRH0]

c) ◯ [p-value = 0.193, RH0]

d) ◯ [p-value = 0.387, RH0]

e) ◉ [p-value = 0.387, FRH0]