

1.24 1:42

$\Delta ve = 11.4$
 $\approx 81\%$

NAME _____

Honor _____

Exam 4

Answer each question. **Show your work**, even if you do most of the answer on a calculator you need to set up the problem and show me what you were using to get that answer. **Circle your final answer**. The honor code is in affect.

1. In The Gallup Organization's latest poll¹, 550 men and 465 women were asked what their favorite Thanksgiving dish was. Turkey was the most liked with 53% of men 45% of the women choosing it as their favorite.

$n_1 = 550$ $n_2 = 465$

- a. You have ^{20%} always thought that men were more partial to meat and so you decide to use Gallup's survey to test whether men like turkey more than women. State the null and alternative hypothesis.

$H_0: p_m - p_w = 0$

$H_A: p_m - p_w > 0$

OR

$p_w - p_m < 0$

↳ change to # 292
than

- b. State your observed and critical value for a test at a .01 significance level.

$\hat{p} = \frac{.53(550) + .45(465)}{550 + 465} = \frac{292 + 209}{1015} = .49$

$\frac{292 + 209}{550 + 465} =$

2.5457
2.5456

$Z_{obs} = \frac{(.53 - .45) - 0}{\sqrt{(.49)(.51)\left(\frac{1}{550} + \frac{1}{465}\right)}} = 2.5457$

$Z_{crit} = 2.326$

one-tail

- c. What is the result of your test, explain in words in relation to the question you are asking.

$Z_{obs} > Z_{crit}$ ^{case} reject H_0

men do like turkey more than women

¹<http://www.gallup.com/poll/content/?ci=14155>

exam4logquestion

2. You are interested in the effect that a democratic society has on the wealth of its people. You have access to the data used in David Dollar's paper "Growth is Good For the Poor". This data set has 411 countries with their income (represented by y) and a variable "voice" that is an index of formal democratic institutions, with greater values of "voice" representing more democratic countries.

a. After entering the data into STATA you find the correlation coefficient using the following command.

```
. correlate y voice
(obs=411)
```

	y	voice
y	1.0000	
voice	0.7185	1.0000

List two things you can determine from this result about the relation between income and democracy.

- 1 - there is a positive relationship between democracy and income
more democracy more income
- 2 - the relationship is relatively strong $r = .72$

b. You next decide to run a regression to find the estimated relation between democracy and income. The following results are obtained.

```
. regress y voice
```

Source	SS	df	MS			
Model	202.235557	1	202.235557	Number of obs =	411	
Residual	189.467736	409	.463246299	F(1, 409) =	436.56	
Total	391.703293	410	.955373885	Prob > F =	0.0000	
				R-squared =	*****	
				Adj R-squared =	0.5151	
				Root MSE =	.68062	

	y	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
voice		.7978629	.0381861	*****	*****	*****
_cons		7.756298	.0369562	*****	*****	*****

b1. Write out the estimated equation.

$$\hat{y} = 7.756298 + .7979(\text{voice})$$

b2. How can you interpret in words the estimated coefficient on voice?

as the democracy index increases by 1 the income of a country will increase by .7979

b3. Recall you are interested in whether more democratic societies lead to greater riches, what is the null and alternative hypothesis used to test this?

$$H_0: \beta_1 = 0$$

$$H_1: \beta_1 \neq 0$$

b4. Construct a 95% confidence interval around the estimated slope coefficient. 2 tail

1.1 = 40%

$$.7979 \pm 1.96 (.03819) = \{.723, .87275\}$$

.0448524

b5. Find you observed value and a critical value for your test at a .05 level of significance.

$$t_{obs} = \frac{.7979 - 0}{.038186} = 20.895$$

$$t_{crit} = 1.96$$

b6. Find the approximate p-value for your test.

$$t_{obs} = 20.895 \text{ well out of } z \text{ table } p \approx 0.00$$

b7. What is the result of your hypothesis test? Explain what this means in words about the tested relationship.

$$t_{obs} > t_{crit} \text{ and } p \approx 0.00 \text{ Reject } H_0.$$

there is a role of democracy in determining country income

exam4logquestion

b8. If you were instead interested in whether the slope coefficient were different than 1, which of the following values would be different than for the test you just conducted (at the same significance level)?

- a. observed value
- b. critical value
- c. p-value
- d. confidence interval

b9. what is the R squared for this regression? Explain in words what this means.

$$R^2 = \frac{202,236}{391.7} = .516$$

we have explained about ~~52%~~ 51.6% of the variation in income with this democracy index

c. You are interested in predicting the income of a country with a known level of democracy. You run the following commands in STATA with the following output.

```
. predict yhat
(option xb assumed; fitted values)
(7 missing values generated)

. predict SEyhat, stdp
(7 missing values generated)

. list y yhat voice SEyhat in 1/15
```

	y	yhat	voice	SEyhat
1.	8.471568	8.140948	.4821	.033703
2.	7.285089	7.771298	.0188	.036662
3.	9.144307	9.05522	1.628	.0575306
4.	9.370928	9.05522	1.628	.0575306
5.	9.448491	9.05522	1.628	.0575306
6.	9.518414	9.05522	1.628	.0575306
7.	9.617887	9.05522	1.628	.0575306
8.	9.346792	8.910966	1.4472	.0520801
9.	6.343881	6.728252	-1.2885	.0728482
10.	9.276034	8.902349	1.4364	.0517655
11.	9.33123	8.902349	1.4364	.0517655
12.	9.509259	8.902349	1.4364	.0517655
13.	6.199223	7.585955	-.2135	.041038
14.	6.977282	7.74441	-.0149	.0371977
15.	6.628041	7.74441	-.0149	.0371977

c1. what is the predicted income of a country that has a democracy level

$$\hat{y} = 9.055 \quad CI = 9.055 \pm 1.96(.05753) = (8.4422, 9.6678)$$

.11276