

1. Researchers and government officials in Boulder, Colorado are studying the impact of universal basic income (UBI) on the personal savings of city residents. The researchers hypothesize that providing all city residents of Boulder with \$1,000 per month will lead to a "significant increase" in personal savings. Data were collected that were relevant to this hypothesis, and a regression was performed.

3 / 3 points

The regression parameter associated with the UBI payment was estimated to be $\hat{\beta}_{UBI} = \$1$, and was (correctly) interpreted as follows: controlling for other variables in the regression (e.g., demographic information, initial wealth), city residents who received the UBI payments saved \$1 more per year, on average, than those who did not receive the payments.

The p-value associated with $\hat{\beta}_{UBI}$ was 0.01. Which of the following statements is correct?

Researchers found a practically significant increase in savings over the course of the year (controlling for other variables).

Researchers found a practically significant increase in savings over the course of the year at the $\alpha = 0.05$ level (controlling for other variables).

Researchers found a statistically significant increase in savings over the course of the year (controlling for other variables).

Researchers found a statistically significant increase in savings over the course of the year at the $\alpha = 0.05$ level (controlling for other variables).

2. Statistical significance implies practical significance.

3 / 3 points

True

False

3. Practical significance implies statistical significance.

3 / 3 points

True

False

4. Estimators of regression parameters have sampling distributions.

3 / 3 points

True

False

5. In order to perform t-tests and confidence intervals in individual regression parameters, we must assume that the error terms are normally distributed.

3 / 3 points

True

False

6. The amount of variability in $\hat{\beta}$ depends on:

4 / 4 points

The values of the predictors.

The value of β .

The error variance.

The response variance.

7. The distribution of $\hat{\beta}$ depends on:

4 / 4 points

The values of the predictors.

The error variance.

The value of β .

The response variance.

8. The t-test for an individual regression parameter β_j can be used to test which of the following null and alternative hypotheses?

4 / 4 points

$$H_0 : \beta_j = 0 \text{ vs } H_1 : \beta_j \geq 0$$

$$H_0 : \beta_j = 5 \text{ vs } H_1 : \beta_j \neq 5$$

$$H_0 : \beta_j = 0 \text{ vs } H_1 : \beta_j > 0$$

$$H_0 : \beta_j = 0 \text{ vs } H_1 : \beta_j \geq 0$$

9. A regression was performed in R, and the following output was obtained.

Call:

```
lm(formula = y ~ x)
```

Residuals:

```
      Min       1Q   Median       3Q      Max
-2.83464 -0.53756 -0.04512  0.59881  1.80620
```

Coefficients:

```
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.9514     0.1163     8.18 6.47e-12 ***
x            3.9163     0.1988    BLANK < 2e-16 ***
```

```
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Residual standard error: 1.007 on 73 degrees of freedom

Multiple R-squared: 0.8417, Adjusted R-squared: 0.8395

F-statistic: 388.1 on 1 and 73 DF, p-value: < 2.2e-16

Find **BLANK**, rounded to the hundreths place.

10.10

19.70

0.78

0.05

10. Call:

```
lm(formula = y ~ x)
```

Residuals:

```
      Min       1Q   Median       3Q      Max
-3.7070 -1.3931  0.1937  0.7267  4.2754
```

Coefficients:

```
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.1721     0.5228     2.242  0.043 *
x            1.0692     0.8470     1.262    BLANK
```

```
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Residual standard error: 2.025 on 13 degrees of freedom

Multiple R-squared: 0.1092, Adjusted R-squared: 0.04066

F-statistic: 1.593 on 1 and 13 DF, p-value: 0.229

Find **BLANK**, rounded to the hundreths place. (HINT: the degrees of freedom provided in the output may be useful!)

0.05

0.23

0.11

0.89