

## Feedback — Quiz 1

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Thank you. Your submission for this quiz was received.

You submitted this quiz on **Sat 11 Jul 2015 2:20 PM SGT**. You got a score of **10.00** out of **10.00**.

### Question 1

Consider the data set given below

```
x <- c(0.18, -1.54, 0.42, 0.95)
```

And weights given by

```
w <- c(2, 1, 3, 1)
```

Give the value of  $\mu$  that minimizes the least squares equation  $\sum_{i=1}^n w_i (x_i - \mu)^2$

Your Answer	Score	Explanation
<input type="radio"/> 0.0025		
<input type="radio"/> 0.300		
<input type="radio"/> 1.077		
<input checked="" type="radio"/> 0.1471	✓ 1.00	
Total	1.00 / 1.00	

### Question 2

Consider the following data set

```
x <- c(0.8, 0.47, 0.51, 0.73, 0.36, 0.58, 0.57, 0.85, 0.44, 0.42)
y <- c(1.39, 0.72, 1.55, 0.48, 1.19, -1.59, 1.23, -0.65, 1.49, 0.05)
```

Fit the regression through the origin and get the slope treating  $y$  as the outcome and  $x$  as the regressor. (Hint, do not center the data since we want regression through the origin, not through the means of the data.)

Your Answer	Score	Explanation
<input type="radio"/> 0.59915		
<input type="radio"/> -1.713		
<input checked="" type="radio"/> 0.8263	✓ 1.00	
<input type="radio"/> -0.04462		
Total	1.00 / 1.00	

### Question 3

Do `data(mtcars)` from the datasets package and fit the regression model with mpg as the outcome and weight as the predictor. Give the slope coefficient.

Your Answer	Score	Explanation
<input checked="" type="radio"/> -5.344	✓ 1.00	
<input type="radio"/> 30.2851		
<input type="radio"/> 0.5591		
<input type="radio"/> -9.559		
Total	1.00 / 1.00	

### Question 4

Consider data with an outcome ( $Y$ ) and a predictor ( $X$ ). The standard deviation of the predictor is one half that of the outcome. The correlation between the two variables is .5. What value would the slope coefficient for the regression model with  $Y$  as the outcome and  $X$  as the predictor?

**Your Answer****Score****Explanation**☐ 0.25☒ 1

1.00

☐ 3☐ 4

Total

1.00 / 1.00

## Question 5

Students were given two hard tests and scores were normalized to have empirical mean 0 and variance 1. The correlation between the scores on the two tests was 0.4. What would be the expected score on Quiz 2 for a student who had a normalized score of 1.5 on Quiz 1?

**Your Answer****Score****Explanation**☐ 0.16☐ 1.0☒ 0.6

1.00

☐ 0.4

Total

1.00 / 1.00

## Question 6

Consider the data given by the following

```
x <- c(8.58, 10.46, 9.01, 9.64, 8.86)
```

What is the value of the first measurement if x were normalized (to have mean 0 and variance 1)?

**Your Answer****Score****Explanation**☐ 9.31

<input type="radio"/> 8.86		
<input type="radio"/> 8.58		
<input checked="" type="radio"/> -0.9719	✓	1.00
Total		1.00 / 1.00

## Question 7

Consider the following data set (used above as well). What is the intercept for fitting the model with x as the predictor and y as the outcome?

```
x <- c(0.8, 0.47, 0.51, 0.73, 0.36, 0.58, 0.57, 0.85, 0.44, 0.42)
y <- c(1.39, 0.72, 1.55, 0.48, 1.19, -1.59, 1.23, -0.65, 1.49, 0.05)
```

Your Answer	Score	Explanation
<input checked="" type="radio"/> 1.567	✓	1.00
<input type="radio"/> 2.105		
<input type="radio"/> -1.713		
<input type="radio"/> 1.252		
Total		1.00 / 1.00

## Question 8

You know that both the predictor and response have mean 0. What can be said about the intercept when you fit a linear regression?

Your Answer	Score	Explanation
<input checked="" type="radio"/> It must be identically 0.	✓	1.00
<input type="radio"/> It must be exactly one.		
<input type="radio"/> It is undefined as you have to divide by zero.		
<input type="radio"/> Nothing about the intercept can be said from the		

information given.

Total	1.00 /
	1.00

## Question 9

Consider the data given by

```
x <- c(0.8, 0.47, 0.51, 0.73, 0.36, 0.58, 0.57, 0.85, 0.44, 0.42)
```

What value minimizes the sum of the squared distances between these points and itself?

Your Answer	Score	Explanation
<input checked="" type="radio"/> 0.573	✓ 1.00	
<input type="radio"/> 0.8		
<input type="radio"/> 0.36		
<input type="radio"/> 0.44		
Total	1.00 / 1.00	

## Question 10

Let the slope having fit Y as the outcome and X as the predictor be denoted as  $\beta_1$ . Let the slope from fitting X as the outcome and Y as the predictor be denoted as  $\gamma_1$ . Suppose that you divide  $\beta_1$  by  $\gamma_1$ ; in other words consider  $\beta_1/\gamma_1$ . What is this ratio always equal to?

Your Answer	Score	Explanation
<input checked="" type="radio"/> $Var(Y)/Var(X)$	✓ 1.00	
<input type="radio"/> $2SD(Y)/SD(X)$		
<input type="radio"/> 1		
<input type="radio"/> $Cor(Y, X)$		
Total	1.00 / 1.00	

