



You are taking "Final Exam" as a timed exam. The timer on the right shows the time remaining in the exam. To receive credit for problems, you must select "Submit" for each problem before you select "End My Exam".

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## Problem 1/4

### Question 1.

25/25 points (graded)

#### Part 1a

A regression analysis between the number of orders a production company receives for a digital device (y) and the price of the device in dollar(x), resulted in the following equation:

$$y = 50000 - 80x$$

The above equation implies that an

- ☐ Increase of \$1 in price is associated with an increase of 80 units in the received orders
- ☐ Increase of \$80 in price is associated with an increase of 1,000 units in the received orders
- ☐ Increase of \$100 in price is associated with a decrease of 42,000 units in the received orders
- ☐ Increase of \$10 in price is associated with a decrease of 80 units in the received orders
- ☒ Increase of \$50 in price is associated with a decrease of 4000 units in the received orders ✓
- ☐ None of above

## Part 1b

The relationship between the number of torches produced in small-size companies ( $x$ ) and the profit in dollar that the companies make from selling these torches ( $y$ ) was studied in 16 small-size companies in Asia by using least squares regression. The following regression equation was obtained from this study:

$$y = -127000 + 18x$$

Suppose that a small-size company sets its profit target to 1,270,000. If the company produce 100,000 torches, the model would predict the company to be:

- ☐ 530,000 above the target
- ☐ 530,000 below the target
- ☐ 1,673,000 above the target
- ☒ 403,000 above the target ✓
- ☐ 1,673,000 below the target
- ☐ 403,000 below the target
- ☐ None of above

## Part 1c

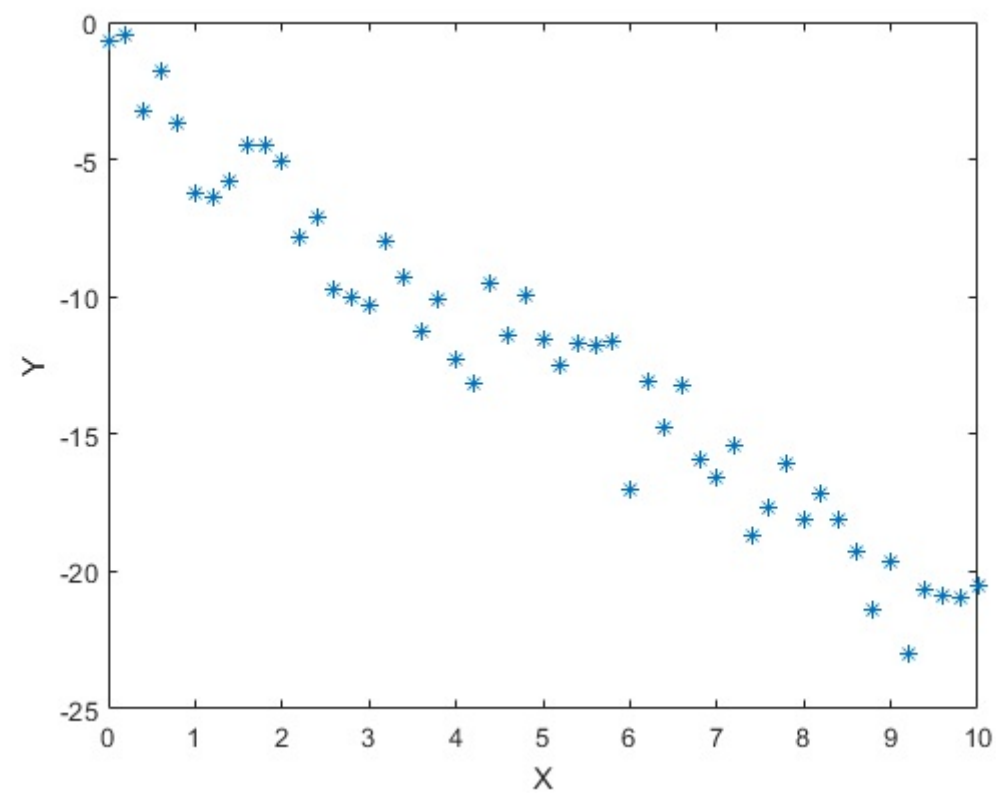
We have access to the data of one the 16 companies that were studied in PART 1B. This company produced 127,000 torches and the real profit that they made from selling these torches was \$1,270,000. What is the absolute value of the residual regarding this observation:

- ☐ 3,429
- ☐ 127,000
- ☒ 889,000 ✓

☐ 1,270,000☐ 2,159,000

## Part 1d

You are going to find a proper place for the new warehouse of your company. You want to understand the trade off between temperature and distance from the coastline in choosing the warehouse location. You have received the following plot which shows the relation between X, distance (in 10 kilometer) from the coastline, and Y, the temperature in Celsius in the winter.



Which value is most likely the approximate value of the correlation between X and Y, and if we regressed Y on X, which value is most likely the approximate value of adjusted R-squared? Select one of the following (correlation, adjusted R-squared) values.

☐ -0.9, +0.1☐ +0.5, +0.1☐ -0.9, -0.9

☐ +0.9, +0.9

☐ 0, -0.1

☐ +0.9, +0.1

☒ -0.9, +0.9 ✓

☐ +0.1, +0.9

☐ -0.1, +0.9

☐ None of above

Submit

You have used 2 of 2 attempts

✓ Correct (25/25 points)

Question 2.

20/20 points (graded)

JJ Painting Company is a well known construction contractor in the Boston area. The company was established in 2001, and they specialize in exterior painting. Management believes that the paint coating thickness is directly correlated with paint drying time. They have conducted a study to uncover the relationship between coating thickness and drying time.

Below are the results of their study.

Coating Thickness (mm)	Drying Time (s)
18.18	165.36
8.07	50.26
20.65	243.27

2.96	109.24
22.45	325.2
22.01	251.41
9.4	157.8
15.22	230.46
4.8	70.47
2.86	102.73
13.3	217.76
20.71	248.95
3.37	132.2
5.14	23.98
22.1	250.54
9.15	157.94
13.18	183.48
15.37	177.54
16.44	213.79
16.48	171.85
25.05	257.97
7.77	97.29
21.2	262.48
6.36	102.71
3.59	101.51
20.39	259.47
18.68	217.13
25.86	386.07

8.26	56.37
13.73	200.39
20.13	277.89
24.82	233.14
9.03	117.34
12.48	164.91
18.61	245.63
2.73	73.63
21.63	288.67
12.38	130.85
24.14	383.72
24.31	274.85
6.18	56.36
8.9	164.6
11.35	222.11
2.12	124
23	344.38
21.09	306.98
24.33	325.71
13.82	164.7
5.65	96.34
7.5	125.71
8.47	114.13
11.82	141.31
1.97	91.78

20.01	211.93
22.9	215.83
13.06	210.06
20.94	291.83
11.43	181.75
14.85	160.37
22.13	323.47
14.3	202.83
24.38	222.66
14.03	169.96
13.51	154.28
10.94	159.66
19.58	264.38
15.71	126.74
16.61	171.31
17.11	183.9
4.55	44.65
15.36	157.67
25.93	345.6
18.18	246.75
3.63	65.85
3.77	175.58
15.82	243.08
1.79	16.57
17.28	224.06

13.88	183.99
24.32	235.78
21.28	218.82
3.79	156.49
17.3	213.65
13.11	162.88
16.48	142.51
8.16	154.52
11.98	197.59
16.67	185.4
23.82	348.92
19.64	242.69
15.14	191.03
20.67	166.75
1.73	62.33

Regress the coating thickness against the paint drying time.

Based on this analysis, how much more time in seconds, will the paint take to dry, if coating thickness is increased by 1 mm.  
Write your answer as a number with at least 2 decimal places.

9.972



9.972



Submit

You have used 1 of 2 attempts

✓ Correct (20/20 points)