**1A Exponential Models**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 3 | 5 | 6 | 8 | 9 | 11 |
|  | 1.04 | 1.49 | 1.79 | 2.58 | 3.1 | 4.46 |

1. The table above shows some data collected on the temperature, in °C, of a colony of bacteria (t), and its growth rate (g).

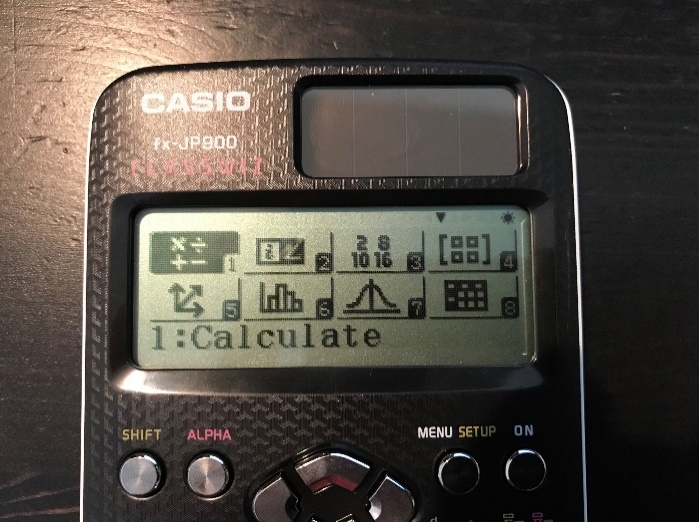
The data are coded using the changes of variable and . The regression line of on is found to be:

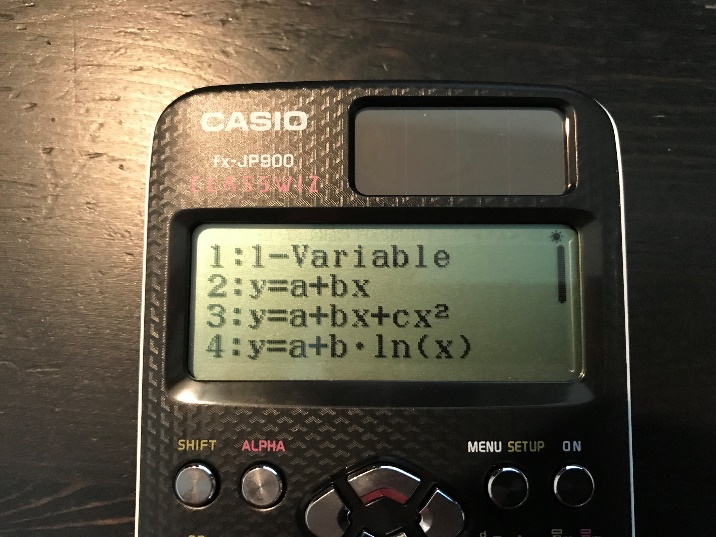
1. Mika says that the constant -0.2215 in the regression line means that the colony is shrinking when the temperature is 0°C. Explain why Mika is wrong.
2. Given that the data can be modelled by an equation of the form , where and are constants, find the values of and .

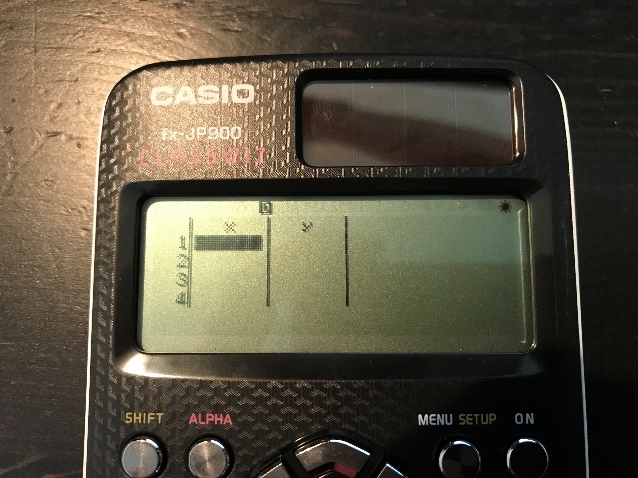
**1B PMCC**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Day of month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|  | 4 | 4 | 8 | 7 | 12 | 12 | 3 | 4 | 7 | 10 |
| g | 13 | 12 | 19 | 23 | 33 | 37 | 10 | n/a | n/a | 23 |

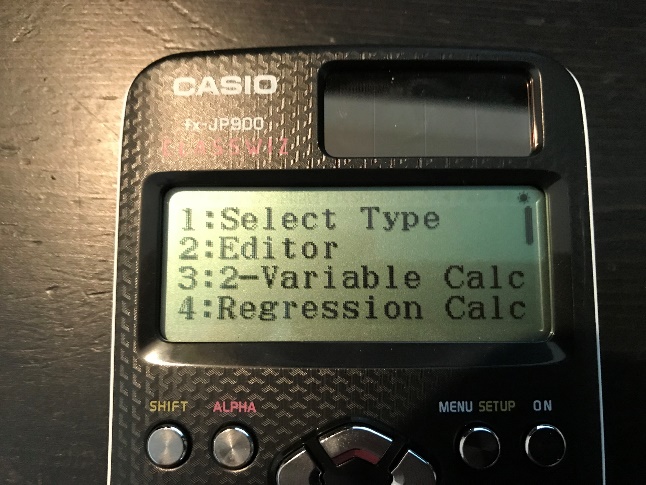
1. From the large data set, the daily mean windspeed, knots, and the daily maximum gust, knots, were recorded for the first 10 days in September in Hurn in 1987.
2. State the meaning of n/a in the table
3. Calculate the product moment correlation coefficient for the remaining 8 days

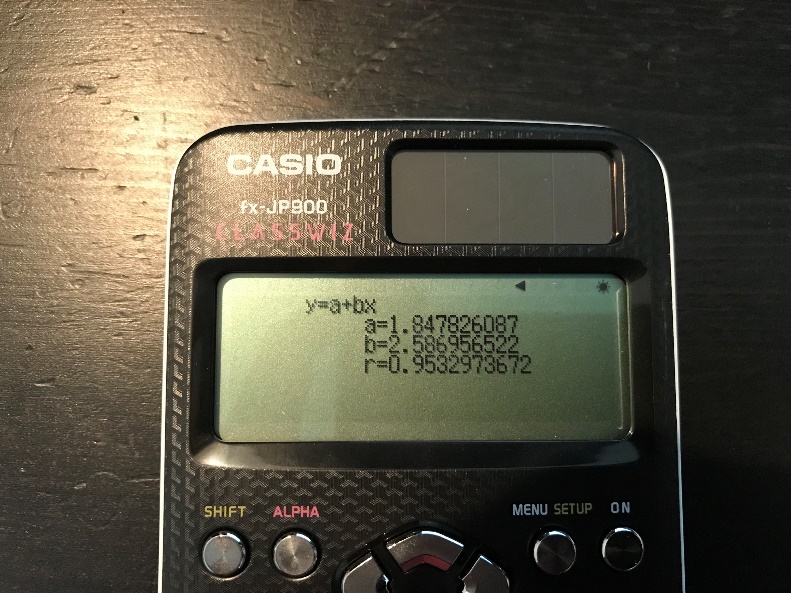










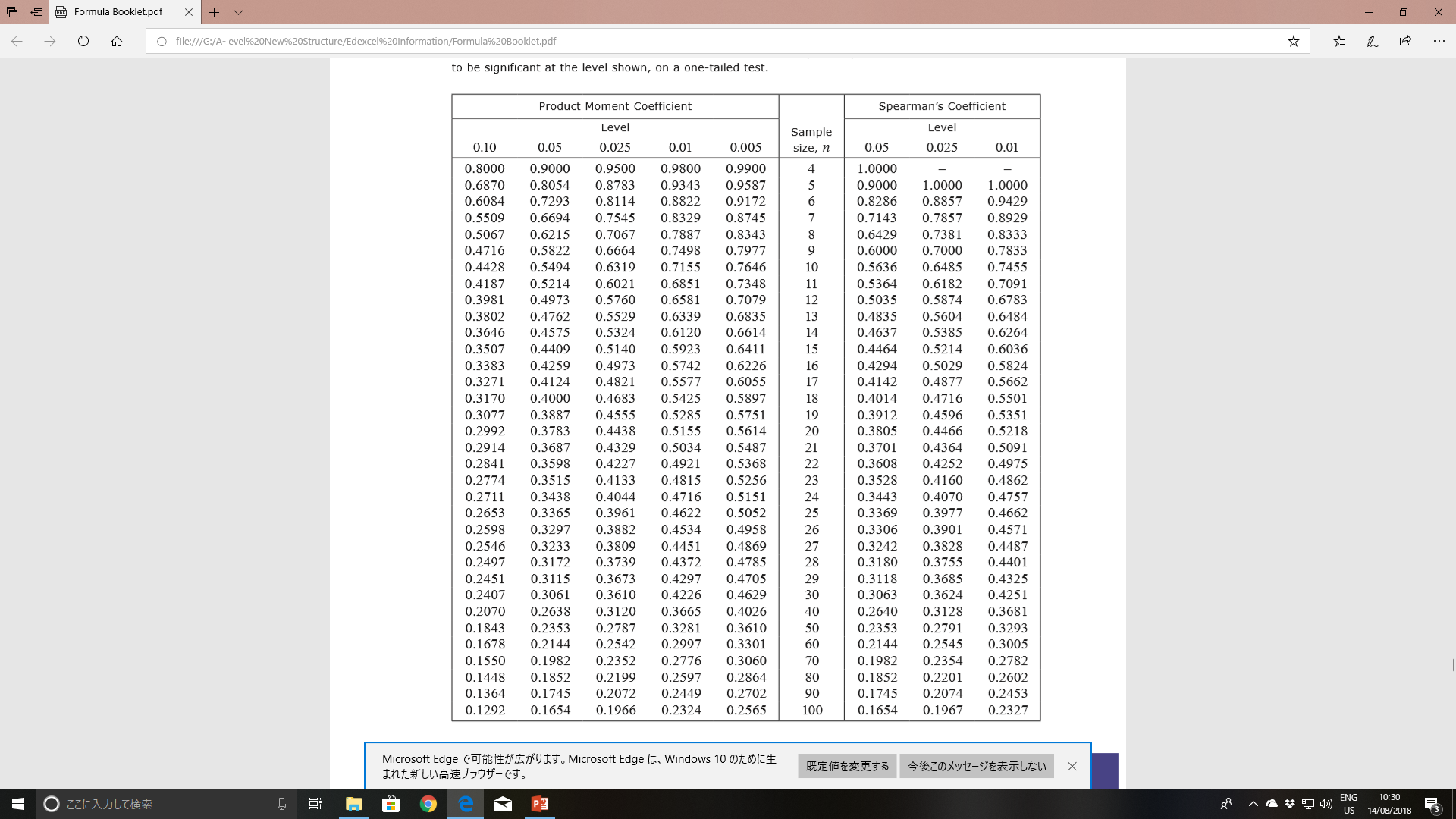


1. With reference to your answer to part b), comment on the suitability of a linear regression model for this data

**1C Hypothesis Testing for Correlation**

1. A scientist takes 30 observations of the masses of two reactants in an experiment. She calculates a PMCC of .

The scientist believes there is no correlation between the masses of the two reactants. Test, at the 10% level of significance, the scientist’s claim, stating your hypotheses clearly.



|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 31 | 28 | 38 | 37 | 18 | 17 | 21 | 29 |
|  | 99 | 94 | 87 | 80 | 80 | 89 | 84 | 86 |

1. The table from the large data set shows the daily maximum gust, kn, and the daily maximum relative humidity, %, in Leeming for a sample of eight days in May 2015.
2. Find the PMCC for these data
3. Test, at the 10% level of significance, whether there is evidence of a positive correlation between daily maximum gust and daily maximum humidity. State your hypotheses clearly