1. Jen is using the large data set to investigate the relationship between Daily Maximum Relative Humidity and Daily Mean Visibility.
   Using the data for Camborne, Jen takes as her sample the first 8 days of October 2015

   Jen's data, without units, is given
   in the table below.

Daily Maximum Relative Humidity	93	92	97	98	100	99	91	96
Daily Mean Visibility	1100	1000	700	700	300	700	2300	1600

The Daily Mean Visibility for 1st October was recorded as 1100

(a) Give an interpretation of this value, including any units.

(a) greatest distance at which an object can be seen and recognised in daylight (2)
(1 mark)

The product moment correlation coefficient for Jen's data, to 3 decimal places, is in this list (a) measured in Decametres (Dm) so 1100 = 1100 × 10 = 11000 m (1mark)

$$0.316 \qquad -0.256 \qquad -0.484 \qquad -0.757 \qquad -1.035$$

One of these values **cannot** be a product moment correlation coefficient.

(b) Explain which value. (b) -1.035 cannot be a correlation coefficient, r, because $-1 \le r \le 1$ (1mark) (1)
perfect −ve   perfect +ve

(c) Use your calculator to identify from the list the correct product moment correlation coefficient for Jen's data. (c) fx-991EX: MENU 6 Stats/y = a+bx/<enter data>
then OPTN / Regression Calc (1)

Jen believes that the Daily Maximum Relative Humidity each day can be used to predict the Daily Mean Visibility. (c) fx-CG50: MENU 2 Statistics /<enter data> (& check SET)
then CALC / REG / X / a+bx

(d) Carry out a suitable test, at the 5% significance level, to show why the data may support Jen's belief.
   State clearly
   (c) cotd. ⟹ r = −0.7573...
   = −0.757 3sf (1mark)
   • your hypotheses
   • your critical value

(e) •sample in one place and time is not representative (3)
   • If H₀ was true you would still obtain values in critical region 5% of the time (2marks)
(e) Give **two** reasons why Jen's belief may still not be correct.
(2)

(d) $H_0 : \rho = 0$ (null hypothesis is always no correlation here)
$H_1 : \rho \ne 0$ (two-tailed because Jen does not express belief
(1mark)   in any direction)

Table "Critical Values for Correlation Coefficients" in Formula Book:
under "Product Moment Coefficient" for Sample Size = 8
5% two-tailed test ⟹ 2½ % each tail ⟹ critical values ± 0.7067 (1mark)

                                    critical value
Observed r = −0.757 < −0.7067   so in critical region ⟹ supports Jen's belief
(1mark)