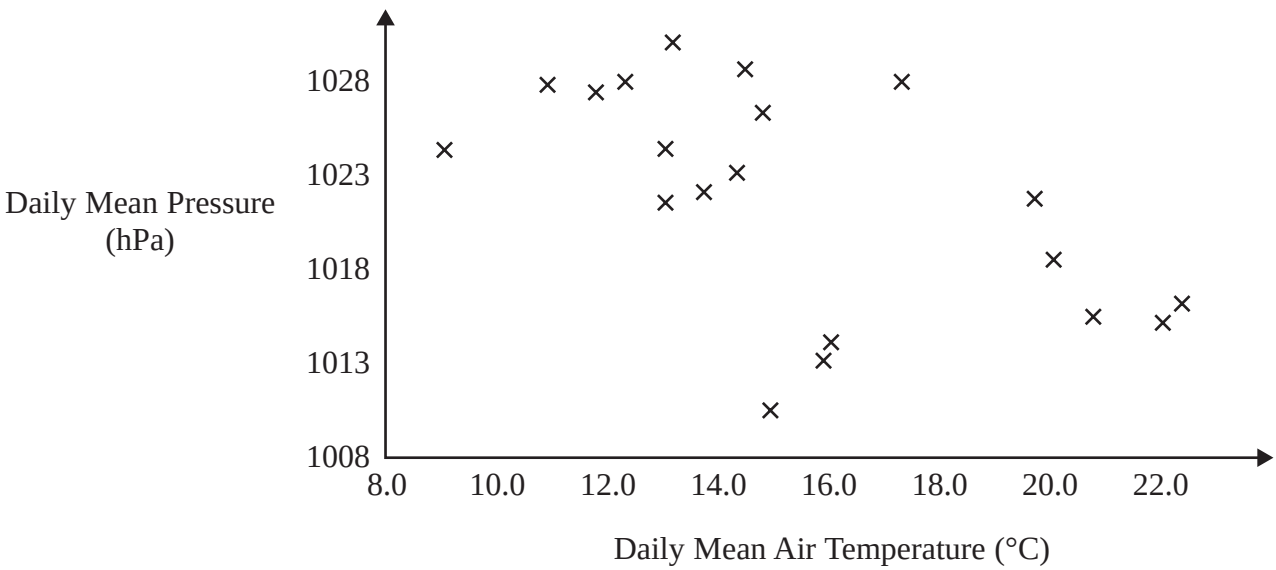
3. Alex wants to investigate whether there is a relationship between Daily Mean Air Temperature and Daily Mean Pressure in Perth.

Alex decides to use simple random sampling to select 20 days from the data in the large data set for Perth from 2015.

(a) Explain how random numbers could be used to do this, with reference to the large data set for Perth from 2015.

(2)



The sample data is displayed in the scatter diagram.
The product moment correlation coefficient for the sample is calculated to be –0.554

(b) (i) Describe the correlation between Daily Mean Air Temperature and Daily Mean Pressure in this sample.

(ii) Explain how the value of the product moment correlation coefficient relates to the scatter diagram.

(2)

Alex wants to investigate whether the correlation is significant.

(c) Test at the 5% level of significance, whether or not there is evidence of a negative correlation between Daily Mean Air Temperature and Daily Mean Pressure for Perth for the period covered by the large data set from 2015.
State your hypotheses and critical value clearly.

(3)

Alex now decides to use Fahrenheit (F) instead of Celsius (C) for the temperature units in the sample, where $F = 1.8C + 32$

(d) Suggest whether or not Alex will need to recalculate the product moment correlation coefficient, giving a reason for your answer.

(1)