Name: _____ Grading #:____ Student ID#: _____

Carleton University
Faculty of Engineering
ECOR 2050

QUIZ #1 – Version 2

October, 2019

Instructions: This is a closed book quiz.
You may use scientific (non-programmable) calculators.
You may use the provided formula sheet and table.
For credit, you must show all of your work.

You have 60 minutes to complete the quiz.

☺ *Good luck!*

Question	Value	Score
1	6	
2	8	
3	9	
4	7	

TOTAL:	**/30**

Full marks are awarded for a clear and neatly presented solution, not only for a correct answer.

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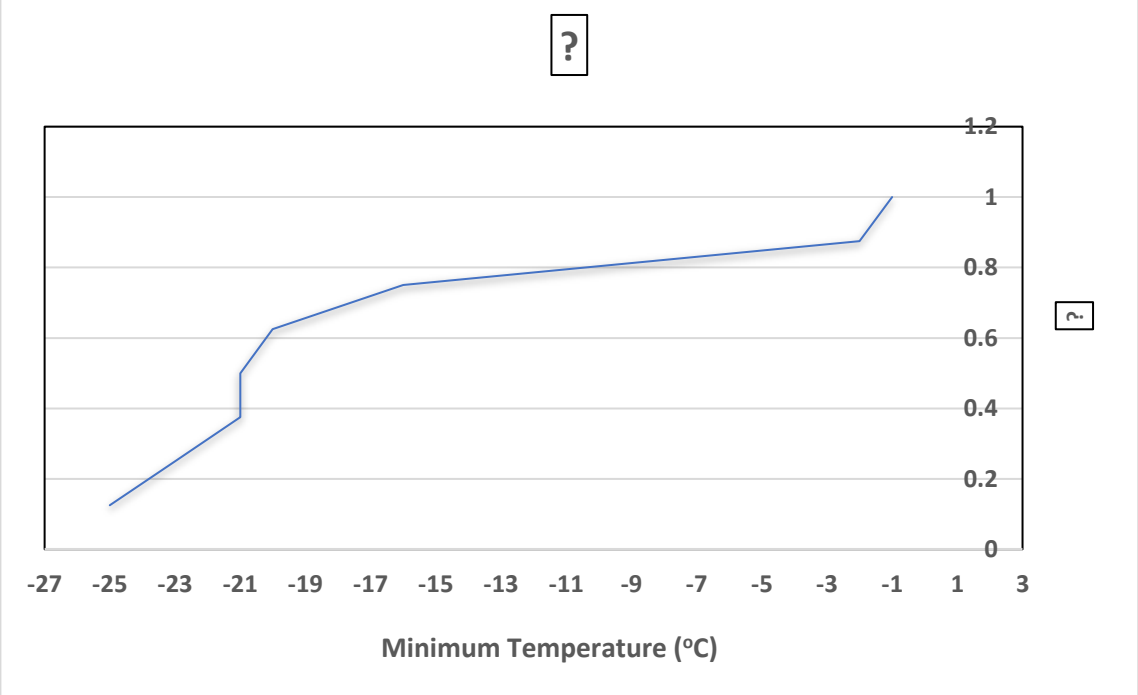
1. The minimum temperature data of some random days in January 2019 in Ottawa are reported in the following table.

Simple random sample of January 2019 daily minimum temperatures (ºC), Ottawa

Date	Jan 01	Jan 04	Jan 11	Jan 14	Jan 17	Jan 24	Jan 28	Jan 31
Temp.	-16	-2	-21	-21	-23	-1	-25	-20

a) The following graph is plotted to demonstrate some properties of the data set. Provide a descriptive title and appropriate y-axis label for the plot. (2 marks)



b) Compute the 20^{th} percentile of the data set. (4 marks)

2. In evaluating a proposed design of a new condominium next to the ocean, the architect wants to know if residents will want bay windows instead of balconies. It is known that the winds in the area are normally distributed with a mean of 25 km/hr. A coefficient of variation is also reported as 1.

   Generally, residents do not sit on the balcony if winds are in excess of 30 km/hr.

   a) What proportion of the time would it be desirable to sit on the balcony? (4 marks)

b) What is the probability that the winds will be within ± 5 km/hr of the given mean? (4 marks)

3. An automatic tire inflator pump is designed so that it pumps an average of 3.2 psi air into empty tires in a car manufacturing factory. Tires for that specific model of car are considered over-inflated if their pressure is above 3.6 psi. Also, the tires are dangerously under-inflated if the pressure is below 2.9 psi. It is known that the amount of pumped air is normally distributed and the standard deviation is 0.484 psi.

   a) How many tires will probably be over inflated during pumping the next 1000 tires? (4marks)

b) below what value (of air pressure) do we get the 8% of the inflated tires with lowest pressures? (4 marks)

c) What does the conclusion of part b reveal? Is it concerning? (1 marks)

4. The probability distribution of X, the number of imperfections per meter of a synthetic fabric, is given by

x	0	1	2	3	4
$f(x)$	0.41	0.37	0.16	0.05	0.01

a) Find the mean of the number of imperfections per meter fabric. (2 marks)

b) If you need 3 meters of the fabric to make a Halloween costume, how many imperfections do you expect to see in your fabric?

c) Find the standard deviation of the number of imperfections per meter. (4 marks)