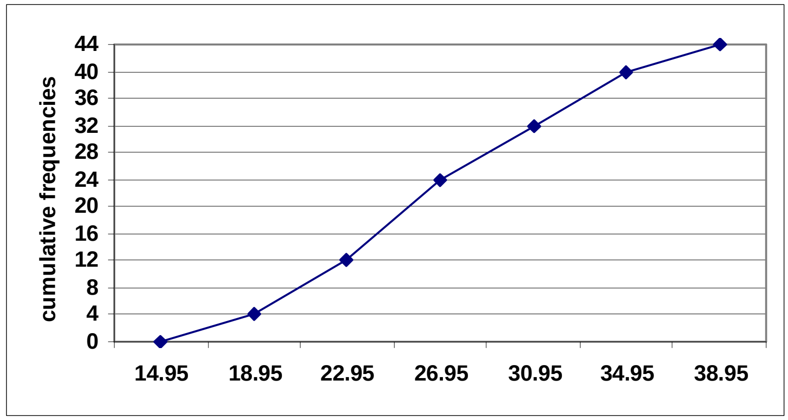
Final Exam | **Dawson College** | **Dec. 14, 2012**
J. Graham | **Math BZS** | **Probability & Statistics**

Instructions: There are twelve questions of equal value. Be sure to clearly indicate your final answer or conclusion. Probability answers can be given as fractions or in decimal form (rounded to four decimal places). Give units whenever units are involved.

Q1. A cumulative frequency polygon is shown here.

a) Sketch the corresponding relative frequency polygon.

b) Estimate the mean of the sample.



Q2. Ranked data is given in the table.

a) Determine the following statistics:

i) The Interquartile Range

ii) The sixtieth percentile

b) Use the Empirical Rule to determine if this sample data is approximately normally distributed.

Ranked Data

28	28	30	31	32	34	36	37
38	39	40	41	42	42	42	43
44	44	46	47	47	47	49	54
55	55	56	59	61	64	65	68

Q3. The number of days y required for concrete to cure was measured at various temperatures x C°.

a) How many days do you predict for concrete to cure at 14 C°? Round off to one decimal place.

b) Interpret the slope of the prediction line.

c) Calculate and interpret the coefficient of determination.

Q4. **Approximately 25% of Canadian men in their 50's have prostate cancer. High levels of prostate specific antigen (PSA) in blood is used as a test for prostate**

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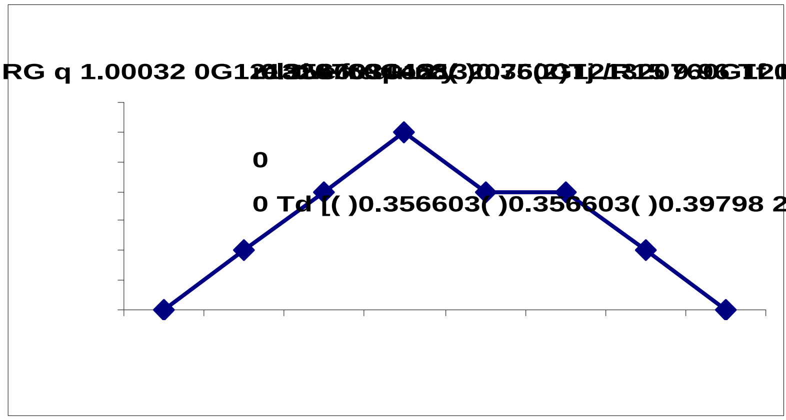
Q1.a)

(c).5 l 4435.58 -4700.51 l [80255 m 32.488 w 0 0 0.5 RG q 1.00032 0G1

boundaries		marks	rf
14.95	18.95	16.95	4/44
18.95	22.95	20.95	8/44
22.95	26.95	24.95	12/44
26.95	30.95	28.95	8/44
30.95	34.95	32.95	8/44
34.95	38.95	36.95	4/44
			44



0
0 Td [( )0.356603( )0.356603( )0.39798 266-1635.5

b)

Q2. a) i) IQR = Q3 – Q1 = 54.5 – 37.5 = 17 **ii) $P_{60} = x_{20} = 47$**

Q3. a) $\hat{y} = 28.004 - 0.5427x$ **days. At $x = 14$ C°, $\hat{y} = 20.4$ days. We predict that it will take about 20.4 days for the concrete to cure at 14 C°.**

b) slope = – 0.5427 tells us that curing time goes down by 0.5427 days for every increase of one degree in temperature.

Q5 a) $= 1$, $P(x) = \frac{\mu^x \cdot e^{-\mu}}{x!} = \frac{1^x \cdot e^{-1}}{x!}$ **P(x 3) = 1 P(0) P(1) P(2) = 0.0803**

b)

Q8. a)

H_o : $\mu \le 0.08$ ppm **Use the t– distribution because the population standard deviation is unknown.**

H_a : $\mu > 0.08$ ppm

df = 59, $t_{0.10} = 1.296$, rejection region $t \ge 1.296$

$$t = \frac{0.086 - 0.08}{\left(0.0331/\sqrt{60}\right)} = 1.404$$ **rejection region**

Decision: Reject H_o

Conclusion: At 10 %

Q11.

a) Use the t – distribution because the population standard deviations are unknown.

df = 69, $t_{0.025}$ = 1.995, $\bar{x}_{\text{no pain}} - \bar{x}_{\text{pain}} = 91.5 - 88.3 = 3.2$ = one – point estimate

$$s^2_{\text{pooled}} = \frac{33 \cdot 5.54^2 + 36 \cdot 7.82^2}{33 + 36} = 46.58419,$$

$$E = (1.995) \cdot \sqrt{\frac{46.58419}{34} + \frac{46.58419}{37}} = 3.2348 \text{ degrees of lateral motion}$$

The 95% C.I.E. is $-0.03 < \mu_{\text{no pain}} - \mu_{\text{pain}} < 6.43$ degrees of lateral motion.

b) Zero is in the interval, so it is possible that there is no difference.
It is possible that $\mu_{\text{no pain}} = \mu_{\text{pain}}$

Q12. a)