**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.
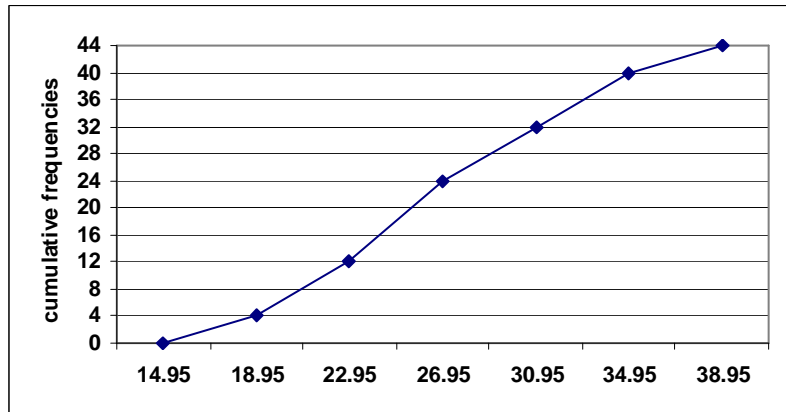


**Q2.** Ranked data is given in the table.

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**

**Q1.a)**

(c).5 I 4435.58 -4700.51 I [80255 m 32.488 w 0 0 0.5 RG q 1.00032 0G12 xxxxxxxxxxxxx(xxxxx)2036(xx)T2/R329 960G1203 xxxxxx2012

| 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 1**
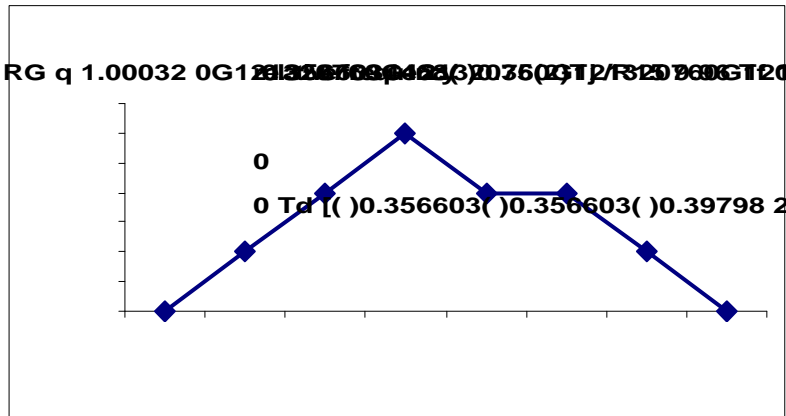
**b)**

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

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

**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)**   $= 1,$  $P(x) = \dfrac{\mu^x \cdot e^{-\mu}}{x!} = \dfrac{1^x \cdot e^{-1}}{x!}$        $P\,x\;3 = 1\quad P\,0\quad P\,1\quad P\,2 = 0.0803$

**b)**

**Q8. a)**

$H_o$ : $\mu$   0.08 ppm                    Use the $t-$ distribution because the population
$H_a$ : $\mu$ > 0.08 ppm                    standard deviation is unknown.

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

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

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)**