

Section I

1	2	3	4	5	6	7	8	9
D	A	B	A	B	C	B	C	B
10	11	12	13	14	15	16	17	18
A	D	C	A	C	B	D	C	A
19	20	21	22	23	24	25		
D	A	C	D	D	B	C		

- Q1 D
- Q2  $4x + 3y - x - 5y = 4x - x + 3y - 5y = 3x - 2y$  A
- Q3  $952.25 - (180.93 + 85.70 + 21.40 + 38.15) = 626.07$  B
- Q4 A
- Q5 B
- Q6 The percentage between 40 minutes ( $Q_L$ ) and 60 minutes (median) is 25%. C
- Q7  $\angle AOB = (360 - 300)^\circ + 51^\circ = 111^\circ$  B
- Q8  $\text{Volume} = \frac{1}{3} \times 35^2 \times 22 = 8983\frac{1}{3}$  C
- Q9 Let  $x$  m be the distance.  $\tan 42^\circ = \frac{67}{x}$ ,  $x \approx 74$  B
- Q10 Exponential decay:  
When  $t = 5$ , value =  $56000(1 - 0.08)^5 \approx 37000$  A
- Q11  $3x^0 + 5x = 3 \times 1 + 5x = 3 + 5x$  D
- Q12 Percentage error =  $\frac{0.5}{49} \times 100\% \approx 1\%$  C
- Q13 Gradient =  $-2$ ,  $y$ -intercept is  $(0, 2)$ ,  $\therefore y = -2x + 2$  A
- Q14 Difference in longitudes:  $131^\circ - 18^\circ = 113^\circ$   
Difference in time (minutes):  $\frac{113^\circ}{15^\circ} \times 60 = 452$  C
- Q15 Let  $\$x$  be the price without GST.  
 $1.12x = 449$ ,  $\therefore x \approx 401$  B
- Q16 D
- Q17 Let  $\$x$  be the amount invested now. There are 20 quarters in 5 years. Interest rate per quarter is 1%.  
 $x \times 1.01^{20} = 60000$ ,  $x \approx 49173$  C
- Q18  ${}^5C_3 = 10$  A

Q19 Remaining years of life for a 45-year-old female : 34.0 years  
She was 65 years old 20 years later and  $\therefore$  14.0 years remained.  
In 1995 at age 65, remaining years of life was 19.8 years according to the table. Difference =  $19.8 - 14.0 = 5.8$  years D

Q20 7.96 is a standard deviation lower than the mean.  
Percentage =  $\frac{100\% - 68\%}{2} = 16\%$  A

Q21  $3 \times 3 \times 2 \times 1 = 18$  C

Q22  $\frac{1}{2} \times 30x \sin 44^\circ = 250$ ,  $x \approx 24$  D

Q23 Three small white and two large red  
=  $3 \times 0.9 + 2 \times 1.5 = 5.7$  standard drinks  
 $BAC(\text{for } 62\text{-kg female in } 5 \text{ hours}) = \frac{10 \times 5.7 - 7.5 \times 5}{5.5 \times 62} \approx 0.057$  D

Q24  $\frac{2x}{3} - 4 = \frac{5x}{2} + 1$ ,  $\frac{2x}{3} = \frac{5x}{2} + 1 + 4$  B

Q25  $870 \times 0.85 \times 0.80 - 50 \approx 541.60$  C

Section II (next page)

## Section II

Q26a Let  $N$  be the total number.  $\frac{18}{N} = \frac{4}{26}$ ,  $N = 117$

Q26b Number of tablets =  $\frac{35 \times 3150}{70} \div 525 = 3$

Q26c  $\ell = \frac{40^\circ}{360^\circ} \times 2\pi \times 6400 \approx 4468$  km

Q26d Amount =  $320 \times 1.029^5 \approx 369.17$  dollars

Q26ei Relative frequency of selecting a red jelly bean  
 $= 1 - (0.32 + 0.13 + 0.14 + 0.24) = 0.17$

Q26eii  $\Pr(\text{not black}) = 1 - 0.14 = 0.86$

Q26f  $0.71(4\pi \times 6400^2) \approx 3.7 \times 10^8$  km<sup>2</sup>

Q26g Calls:  $561 - 550 = 11$  dollars

Data:  $(1.7 \times 1024 - 500) \times 0.0293 = 36.36$  dollars

Phone bill amount =  $49.00 + 11.00 + 36.36 = 96.36$  dollars

Q27a Let  $x$  m be the length of the shadow.

$$\frac{x}{19.2} = \frac{5}{1.65}, x \approx 58.18$$

Q27b Number of drops per minute =  $\frac{2400}{12 \times 60} \times 15 = 50$

Q27ci Second equation – first equation :  $18y = 1260$ ,  $y = 70$  and  
 $x = 1510 - 18 \times 70 = 250$

Q27cii Number of months to repay the loan in full  
 $= \frac{4800 - 250}{70} = 65$

Q27di IQR =  $680 - 490 = 190$ ;  $680 + 1.5 \times 190 = 965$   
 $970 > 965$ ,  $\therefore 970$  is an outlier

Q27dii The distribution is translated by 20 in the positive direction and the standard deviation remains the same.

Q27e 42 megabytes =  $42 \times 1024$  kilobytes =  $42 \times 1024^2$  bytes  
 $= 42 \times 1024^2 \times 8$  bits

Download rate = 500 kilobits per second = 500000 bits per second

$$\therefore \text{download time} = \frac{42 \times 1024^2 \times 8}{500000} \approx 704.643 \text{ seconds}$$

$\approx 11$  minutes 45 seconds

Q28a Area (cm<sup>2</sup>) =  $\pi(5^2 - 3^2) \approx 50.27$

Q28b Mathematics:  $z = \frac{74 - 70}{6.5} \approx 0.6154$

English:  $z = \frac{80 - 75}{8} = 0.625$

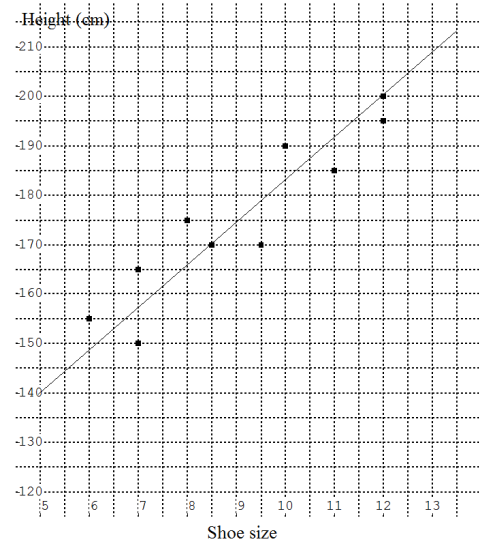
$0.625 > 0.6154$ ,  $\therefore$  Kristoff is correct.

Q28c  $V = \frac{15}{3}(45 + 4 \times 180 + 35) = 4000$  cm<sup>3</sup> = 4 litres

Q28d Transpose to make  $F$  the subject of the formula,

$$F = \frac{9C}{5} + 32 = \frac{9 \times 3}{5} + 32 \approx 37.4^\circ$$

Q28ei

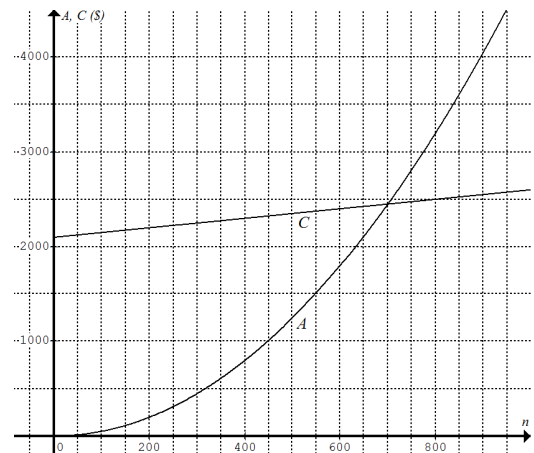


Q28eii Height difference =  $175 - 162 = 13$  cm

Q28eiii Correlation coefficient = 1 cannot be correct because the data points are not in line.

Q28fi  $\$C = 2100 + 0.50n$

Q28fii Make  $n = 700$  calls to break even.



Q29a Interest =  $425 \times 0.184 \times \frac{12}{365} \approx 2.57$

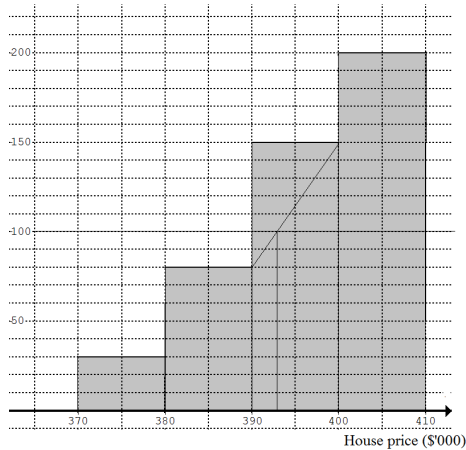
Amount paid (\$) =  $425 + 2.57 = 427.57$

Q29b Jamal repaid the loan fully 8 years (96 months) earlier,  $\therefore$  he paid  $\$1880 \times 96 = \$180480$  less.

Q29ci By measurement the length =  $1.5 \times$  the length of the dotted line =  $1.5 \times 12 = 18$   
Area (m<sup>2</sup>)  $18 \times 12 = 216$

Q29cii Volume of rain (m<sup>3</sup>) =  $216 \times 0.005 = 1.08$   
 $\pi 1.8^2 \Delta h = 1.08$ , increase in depth  $\Delta h \approx 0.1061 \text{ m} = 106.1 \text{ mm}$

Q29di \$393000



Q29dii

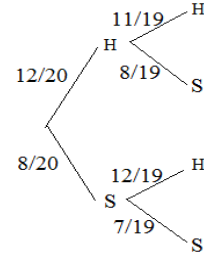
Class Centre (\$'000)	Frequency
375	30
385	50
395	70
405	50

Mean house price (\$'000)  
=  $\frac{1}{200} (375 \times 30 + 385 \times 50 + 395 \times 70 + 405 \times 50) = 392$   
i.e. \$392000

Q29e Label the vertical axis as the y-axis. Locate the y-intercept and the turning point (maximum), read the y-coordinates of the two points and calculate the difference between them.

Q30a Total power =  $21 \times 20 = 420 \text{ W} = 0.42 \text{ kW}$   
Time =  $11 \times 7 \times 24 = 1848 \text{ h}$   
Total energy consumption (kWh) =  $0.42 \times 1848 = 776.16$   
Savings (\$) =  $0.31 \times 776.16 \approx 240.61$

Q30b



$\Pr(HS \cup SH) = \Pr(HS) + \Pr(SH) = \frac{12}{20} \times \frac{8}{19} + \frac{8}{20} \times \frac{12}{19} = \frac{48}{95}$

Q30ci PV (\$) =  $55.68446 \times 200 \approx 11136.89$

Q30cii 6 years = 72 months ; 10.8% per annum = 0.0090 per month  
Monthly repayment (\$) =  $\frac{21500}{52.82118} \approx 407$

Q30d Distance (m) travelled in 2 seconds =  $\frac{110}{3.6} \times 2 \approx 61.1$   
Stopping distance (m) =  $61.1 + 59.2 \approx 120$

Q30ei

Length of PC =  $\sqrt{5.4^2 + 1.8^2 - 2 \times 5.4 \times 1.8 \cos 108^\circ} \approx 6.197 \text{ m}$

Q30eii Let  $\theta^\circ$  be the measure of  $\angle PCS$ .

$\frac{\sin \theta^\circ}{5.4} = \frac{\sin 108^\circ}{6.197}$ ,  $\theta^\circ \approx 55.97^\circ$   
 $PE = 2.1 + h = 6.197 \sin(90^\circ - 55.97^\circ)$   
 $h = 1.368 \text{ m}$

Please inform [mathline@itute.com](mailto:mathline@itute.com) re conceptual, mathematical and/or typing errors.