

Section I

1	2	3	4	5	6	7	8
A	D	B	C	B	B	D	C

9	10	11	12	13	14	15	16
C	C	A	B	D	A	A	C

17	18	19	20	21	22		
D	D	B	C	B	B		

Q1 A

Q2 $V = \frac{4}{3}\pi(2)^3 = 33.51$ D

Q3 $\frac{30}{x} = \tan 65^\circ$, $x = \frac{30}{\tan 65^\circ} = 14.0$ m B

Q4 $\frac{28+38}{2} = 33$ C

Q5 In two weeks $2(200) + 40n = 2640$, $n = 56$ B

Q6 $60 \times \frac{1}{6} = 10$ B

Q7 $m = \frac{1}{2}$, $c = 1$, $y = \frac{1}{2}x + 1$ D

Q8 C

Q9 Area = $\frac{1}{2}(39)(47)\sin 21^\circ = 328$ m² C

Q10 $\frac{4}{24} = \frac{1}{6}$ C

Q11 $\frac{27 \times 1000}{3600} = 7.5$ ms⁻¹ A

Q12 $\frac{62 \times 5 + 14}{6} = 54$ B

Q13 D

Q14 A

Q15 $\binom{6}{2} = 15$ A

Q16 C

Q17 $\mu - \sigma < X < \mu + 2\sigma$,

$68\% + \frac{95-68}{2}\% = 81.5\%$ D

Q18 $4p = 5t + 2q^2$, $q^2 = \frac{4p-5t}{2}$, $q = \pm\sqrt{\frac{4p-5t}{2}}$ D

Q19 Distance apart = arc length $l = \frac{\pi r \theta}{180}$
 $= \frac{\pi 6400(16+52)}{180} \approx 7600$ km B

Q20 Before the increase, radius = r , $A = 4\pi r^2$.
 After the increase, radius = $1.10r$, $A = 4\pi(1.10r)^2 = 1.21(4\pi r^2)$.
 $\therefore \Delta A = 0.21(4\pi r^2)$,
 $\% \Delta A = \frac{\Delta A}{A} \times 100\% = 0.21 \times 100\% = 21\%$ C

Q21 Amount owing
 $= 420000 \left(1 + \frac{7.2}{12 \times 100}\right) - 4000 = \418520 B

Q22 Increase $80000 - 50000 = 30000$.
 From 50001 to 70000, additional tax = $0.35 \times 20000 = \$7000$.
 From 70001 to 80000, additional tax = $0.52 \times 10000 = \$5200$.
 Total additional tax = $7000 + 5200 = \$12200$.
 $\%$ of increase = $\frac{12200}{30000} \times 100\% = 40.7\%$ B

Section II

Q23a $\frac{ab^2}{w} \times \frac{4w}{3b} = \frac{4ab}{3}$.

Q23bi 19°C

Q23bii Feb

Q23biii May, June, July, August and September.

Q23ci Assign a natural number from 1 to n to each name on the list of students, where n is the number of students at Vicki's school. Use a calculator to generate 200 random numbers between 1 and n (inclusive).

Q23cii $\bar{x} = \frac{2 \times 69 + 7 \times 72 + 12 \times 38 + 17 \times 21}{200} = 7.275$ hours

Q23di \$6.00

Q23dii 4 kg or 7 kg

Q23diii $4 < w \leq 6$ or $w > 7$

Q23div Rate = $\frac{12}{8} = \$1.50$ per kilogram

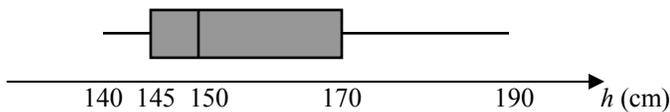
Q24a Number of sales of Y appears to be double that of X.
Volume of Y sold appears to be 8 times that of X.

$$Q24bi \quad \cos \theta = \frac{44}{130}, \quad \theta = \cos^{-1}\left(\frac{44}{130}\right) = 70^\circ$$

$$Q24bii \quad x = \sqrt{44^2 + 130^2 - 2(44)(130)\cos 53^\circ} = 109 \text{ cm}$$

$$Q24c \quad \text{Median} = \frac{145 + 155}{2} = 150, \quad Q_L = 145,$$

$$Q_U = \frac{165 + 175}{2} = 170, \quad \text{min} = 140, \quad \text{max} = 190$$



$$Q24di \quad \text{Volume} = 1890 \times 300 = 567000 \text{ cm}^3.$$

$$\text{Capacity} = \frac{567000}{1000} = 567 \text{ litres.}$$

$$Q24dii \quad A = \pi ab, \quad 2 \times 1890 = \pi \left(\frac{80}{2}\right) d, \quad d = 30 \text{ cm.}$$

$$Q25ai \quad 3! = 6$$

$$Q25aai \quad \Pr(J) = \frac{2}{6} = \frac{1}{3}$$

$$Q25aiii \quad \Pr(\text{not } C) = 1 - \Pr(C) = 1 - \frac{1}{3} = \frac{2}{3}.$$

Q25bi From 23May to 20June, 29 days.

$$Q25bii \quad \text{Interest} = 617.72 \times \frac{0.0498}{100} \times 29 = \$8.92$$

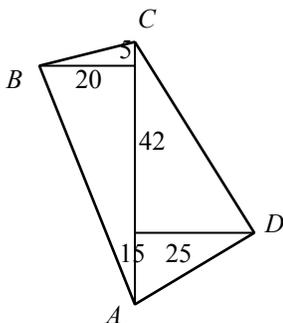
$$Q25ci \quad \Pr(\text{first}) = \frac{1}{180} \times 3 = \frac{1}{60}$$

$$Q25cii \quad \Pr(\text{first \& second}) = \frac{3}{180} \times \frac{2}{179} = \frac{1}{5370}$$

$$Q25d \quad \text{For Martha, } E = \frac{\left(1 + \frac{6}{100 \times 12}\right)^{48} - 1}{48} = 0.005635 \text{ per}$$

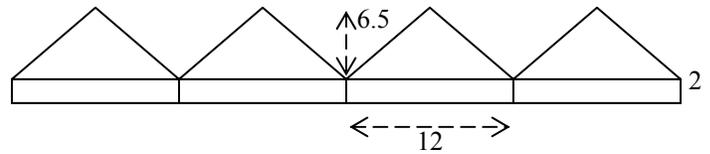
month or $0.005635 \times 12 = 0.0676 = 6.76\%$ per annum. Martha has a better deal than Paul's 6.1% per annum.

Q26ai



$$Q26aai \quad CD = \sqrt{47^2 + 25^2} = 53 \text{ m}$$

Q26bi



$$Q26bii \quad \text{Surface area} = 4 \left(12 \times 2 + \frac{1}{2} \times 12 \times 6.5 \right) = 252 \text{ m}^2.$$

$$Q26ci \quad A = 200 - (74 + 12 + 16) = 98$$

$$Q26cii \quad \Pr(\text{positive result}) = \frac{74}{74 + 12} = \frac{37}{43}$$

$$Q26ciii \quad 12 + 16 = 28$$

$$Q26d \quad 0^\circ \text{ E and } 120^\circ \text{ E are } 120^\circ \text{ apart, } \therefore \frac{120}{360} \times 24 = 8 \text{ hours}$$

apart. \therefore 9.30 am Monday (London time) was 5.30 pm Monday (Manila time). Cassie arrived in Manila at 4.00 pm Tuesday (Manila time), a difference of 22.5 hours. Take off the stopping time of 5 hours, the total flying time was 17.5 hours.

Q27ai \$130000, 30 years.

$$Q27aai \quad \text{Extra interest} = 1338.30 \times 240 - 1529.04 \times 180 = \$45964.80$$

Q27bi A person's height must be greater than zero, i.e. $x > 0$.

$$Q27bii \quad \Delta L = m \Delta h = \frac{25 - 19}{180 - 160} \times 10 = 3 \text{ cm}$$

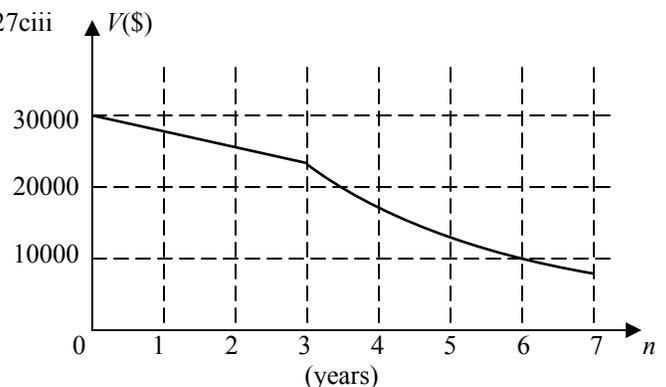
Q27biii The calculated correlation coefficient is

- (1) negative instead of positive,
- (2) not within $-1 \leq r \leq 1$.

$$Q27ci \quad \text{Value} = 30000 - 2000 \times 3 = \$24000$$

$$Q27cii \quad V = V_0(1 - r)^n = 24000 \left(1 - \frac{25}{100}\right)^4 = \$7593.75$$

Q27ciii



Q28ai

\$2 + 50c;

\$1 + \$1 + 50c

\$1 + 50c + 50c + 50c

50c + 50c + 50c + 50c + 50c

Q28aii She must select a \$2 coin and a 50c coin.

$$\Pr(\$2.50) = \Pr(\$2 + 50c) + \Pr(50c + \$2) = \frac{3}{11} \times \frac{2}{10} + \frac{2}{11} \times \frac{3}{10} = \frac{6}{55}$$

Q28aiii Total value = $2x + y + 0.5w$ dollars.

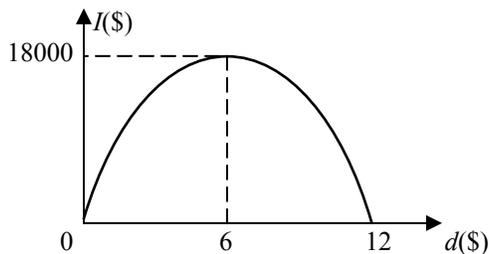
$$\text{Q28bi } \frac{6000}{500} = \$12$$

Q28bii Number of vehicles $6000 - 500 \times 5 = 3500$

Daily income = $5 \times 3500 = \$17500$

Q28biii $v = 6000 - 500d$

Q28biv Daily income $I = dv = d(6000 - 500d)$ dollars.



Anne is incorrect because what she said is not always true.

When $d = 6$,

daily income is maximum $I_{\max} = 6(6000 - 500 \times 6) = \18000 .

Please inform mathline@itute.com re conceptual, mathematical and/or typing errors.