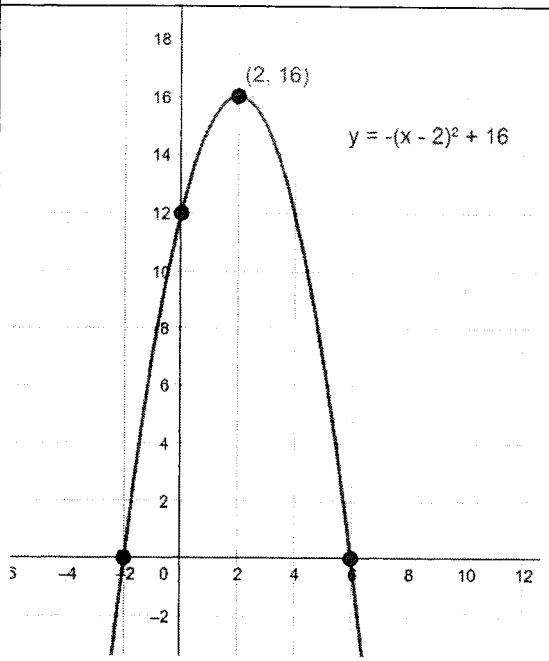
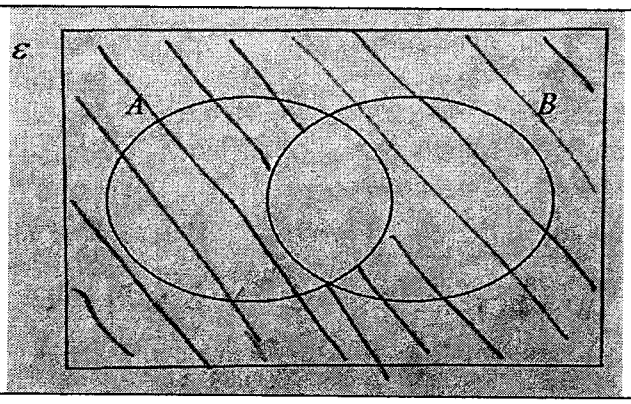
Yio Chu Kang Secondary School
4E/5N Prelim Mathematics P1 2025
Marking Scheme

Qn	Solutions	Marks	Marker's Comments
1	$5p-4-(3+2p)+p-6$ $=5p-4-3-2p+p-6$ $=4p-13$	M1 A1	Well done
2a	$x<0 \quad or \quad x\geq 3$	A1	Poorly done
2b	3	B1	
3	$\frac{3x-2}{12}-\frac{5x-3}{8}-\frac{7(x+1)}{6}$ $=\frac{2(3x-2)-3(5x-3)-4\times 7(x+1)}{24}$ $=\frac{6x-4-15x+9-28x-28}{24}$ $=\frac{-37x-23}{24}$	M1 M1 A1	Many did not use LCM of denominators, hence some final answers were not in lowest term
4a	35	B1	
4b	Incorrect. Median mark means <u>50%</u> of students scored <u>both more than or less than</u> the mark.	B1	Poor
5a	$24pq^2+15pq-9p^2q$ $=3pq(8q+5-3p)$	B1	
5b	$5+2a^2bc-5ac-2ab$ $=5-5ac+2a^2bc-2ab$ $=5(1-ac)-2ab(1-ac)$ $=(1-ac)(5-2ab)$ accept $(ac-1)(2ab-5)$	M1 A1	
6a	$1.25\ km : 1\ cm$ $1\ km : \frac{1}{1.25}\ cm$ $10\ km : \frac{10}{1.25}=8\ cm$	M1 A1	Poor conversion of units
6b	$1\ cm^2 : 1.25^2\ km^2 = 1.5625\ km^2$ $6.56\ cm^2 : 6.56\times 1.25^2\ km^2 = 10.25\ km^2$	M1 A1	Some did not take square of the map scale
7	$(23-3d)+(23-2d)+(23-d)+23+(23+d)=80$ $-5d+115=80$ $d=7$ $w=2, x=9, y=16, z=30$	B2 Deduct 1 mark for each error	Poorly done despite being a common past yr's O lvl qn

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8a	$2(44-28)+28\theta+44\theta=72\pi-76$ $72\theta=72\pi-76-32$ $\theta=\frac{72\pi-108}{72}$ $angle\ AOB=\pi-1.5$	M1 A1	Poorly done as many used the formula for degree
8b	$area=\frac{1}{2}\times44^2(\pi-1.5)-\frac{1}{2}\times28^2(\pi-1.5)$ $=946\ cm^2\ (3sf)$	M1 A1 (ecf)	Poorly done as many used the formula for degree
9a	$\cos\angle ACD=-\frac{5}{12}$ or $\cos\angle ACB=\frac{5}{12}$ $\angle ACD=\cos^{-1}\left(-\frac{5}{12}\right)$ $\angle ACB=\cos^{-1}\frac{5}{12}=65.375°$ $=114.624°$ $\angle ACD=180°-65.375°$ $=114.6°$	M1 A1	Some did not leave answer in 1dp
9b	$360°-(114.624°-90°)=335.4°$	B1	Some did not leave answer in 1dp
10ai	$60-30=30$	M1A1	
10aii	36 marks	B1	
10b	$\frac{390-180}{400}=\frac{21}{40}$ (accept 0.525 & 52.5%)	M1A1	
11a	168.0 (4sf)	B1	Generally ok
11b	$P=2w-\frac{x^2y}{w}$ $\frac{x^2y}{w}=2w-P$ $x^2y=2w^2-Pw$ $x^2=\frac{2w^2-Pw}{y}$ $x=\pm\sqrt{\frac{2w^2-Pw}{y}}$	 M1 M1 A1	Some wrote: $P=2w-\frac{x^2y}{w}$ $Pw=2-x^2y$ Quite a number still weak in algebraic manipulation . Many did not include the ±
12	$AB^2=26^2=676$ $AC^2+BC^2=24^2+10^2=676=AB^2$ By the converse of Pythagoras' Theorem, ΔABC is a right-angled triangle. Hence, by the converse of right-angle in semi-circle, AB is the diameter of the circle.	M1 M1 A1	Poorly done as students are weak in explanation. Did not use the word "converse" when explaining using Pythagoras' Thm

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13	$8x-3y=25-----(1)$ $12x+5y=9-----(2)$ $(1)\times 5,\quad 40x-15y=125-----(3)$ $(2)\times 3,\quad 36x+15y=27-----(4)$ $(3)+(4),\quad 76x=152$ $x=2$ $y=-3$	M1 A1 A1	Generally well done.
14		S1 – correct shape MP1 – correct max pt I1 – correct x-ints and y-int	Generally ok except for the location of the maximum point. Some indicate the point at (0,16)
15	$A=50000\left(1+\frac{3.6/12}{100}\right)^{3\times 12}$ $=55693.38$ $Int=55693.38-50000$ $=\$5693.38$	M1 M1 A1	Badly Done. Did not divide by 12 for 3.6 and change 3 years to 36 months although the question stated to compound monthly.
16a		B1	Generally ok

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16b	$A \cap B'$	B1	Generally ok
17a	7.28×10^{-3}	B1	Generally well done
17bi	81.7×10^{500}	B1	Those who got it wrong did not understand what the question is asking.
17bii	$\left(6.3\times10^{500}\right)+\left(8.17\times10^{501}\right)$ $=\left(6.3+81.7\right)\times10^{500}$ $=88\times10^{500}$ $=8.8\times\times10^{501}$	M1 A1	Most of the students who did not get b(i) correctly will not be able to solve b(ii) as well.
18i	$504=2^3\times3^2\times7$	B1	Generally well done
18ii	1st number : $\left(2^2\times3\times7\right)\times2=168$ 2nd number : $\left(2^2\times3\times7\right)\times3=252$	B2	Generally ok. Those who did not answer correctly were mainly because they did not understand HCF and LCM fully.
19	$x=25.277°$ *or* $180°-25.277°$ $x=25.3°$ *or* $154.7°$	B2	Many did not correct to 1 dp for degrees
20a	$1944=D+66\times24$ $D=1944-1584$ $=\$360$	M1 A1	Generally ok
20b	*Int* : $1944-1800=\frac{(1800-360)(R)(2)}{100}$ $R=\frac{144\times100}{1440\times2}=5$	M1 A1	Poorly done. Did not know that they need to use simple interest formula to calculate the interest rate per annum. For those who knew, they substitute either the wrong interest or principal value.
21a	$\frac{7+6t+28+25+13+8t^2+12}{7}=16$ $8t^2+6t-27=0$ $(2t-3)(4t+9)=0$ $t=1.5\,(shown)$ *or* $-2.25\,(rej)$	M1 M1 A1	Generally ok.

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21b	1. Kalea studied longer, on average, as her mean is higher. 2. Kalea's studying hour is more widespread as her SD is higher.	B1 B1	Generally ok. Some students are not explain when SD is higher, it means more widespread.
22	$(2x^2-5x+3)(5x-4)$ $=10x^3-8x^2-25x^2+20x+15x-12$ $=10x^3-33x^2+35x-12$	M1 A1	Generally ok except for some students are not able to expand with careless mistakes such as -20x instead of +20x.

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23a	$y=(8x-3)(2x+3)-(4x)^2$ $=16x^2+18x-9-16x^2$ $=18x-9$ Since $18x$ is an even number & 9 is an odd number, therefore $18x-9$ will be an odd number.	M1 M1 A1	Poorly done. Some students assumed that 18x-9 is the final answer and did not explain why 18x-9 will be an odd number.
23b	$x=1$ and $y=9$	B1	Poorly done as they did not substitute an appropriate value for x to the equation 18x-9. They did not see the connection to part (a)
24	$\frac{5x^2-15x}{x^4-81}$ $=\frac{5x(x-3)}{(x^2-9)(x^2+9)}$ $=\frac{5x(x-3)}{(x-3)(x+3)(x^2+9)}$ $=\frac{5x}{(x+3)(x^2+9)}$	M2 A1	Most is able to factorize the numerator by picking up common factor of 5x. However, most did not factorize x^4-81. Those who manage to factorize $x^4-81=(x^2-9)(x^2+9)$ but did not factorize (x^2-9)
25	$x^2+16x+18=0$ $(x+8)^2-8^2=-18$ $(x+8)^2=-18+64$ $x+8=\pm\sqrt{46}$ $x=-1.22\,(2dp)$ *or* $-14.78\,(2dp)$	M1 A2	Generally ok for those who use the completing the square method. Some students use quadratic formula to solve. There are quite a number who roundoff to 3 S.F instead of 2 d.p.

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26i	$V=\frac{1}{3}\pi(6)^2(14)=168\pi$	B1	Generally ok. Some students did not leave answers in terms of π
26ii	Using Similar □s, $\frac{r}{6}=\frac{7}{14}$ $r=3$ $V=\frac{1}{3}\pi(3)^2(7)=21\pi$	 M1 A1	Some students who did not use similar triangles to get radius is 3cm.
26iii	Using Similar figures, $\left(\frac{h}{14}\right)^3=\frac{168\pi-21\pi}{168\pi}$ $\frac{h}{14}=\sqrt[3]{\frac{147}{168}}$ $h=13.4\,(3sf)$	 M1 A1	Poorly done. Students did not see that they can use similar figures to get the volume. Some tried to get the values for radius or height but applied the wrong concept of using height of 7cm and 14cm as the ratio of similar heights.
27a	$\overrightarrow{OC}=\overrightarrow{OB}+\overrightarrow{BC}=4\mathbf{a}+3\mathbf{b}$ $\overrightarrow{AE}=\overrightarrow{AO}+\overrightarrow{OE}$ $=\overrightarrow{AO}+\frac{1}{3}\overrightarrow{OC}$ $=-3\mathbf{a}+\frac{1}{3}(4\mathbf{a}+3\mathbf{b})$ $=-3\mathbf{a}+\frac{4}{3}\mathbf{a}+\mathbf{b}$ $=-\frac{5}{3}\mathbf{a}+\mathbf{b}\quad(shown)$	M1 A1	Generally ok.

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27b	$\overrightarrow{AF} = \overrightarrow{AO} + \overrightarrow{OF}$ $= -3\mathbf{a} + \frac{3}{5}\overrightarrow{OB}$ $= -3\mathbf{a} + \frac{3}{5}(3\mathbf{b})$ $= -3\mathbf{a} + \frac{9}{5}\mathbf{b}$ $= \frac{9}{5}\left(-\frac{5}{3}\mathbf{a} + \mathbf{b}\right)$	M1 A1	Generally ok.
27c	Since $\overrightarrow{AF} = \frac{9}{5}\overrightarrow{AE}$ & A is a common point, points A, E and F lie on a straight line.	M1 A1	Poorly done. Students did not know how to get the scalar and state that A is a common point.
27d	$\frac{1}{2} \times 30 = 15cm^2$	B1	Generally ok.

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Yio Chu Kang Secondary School
4E/5N Prelim Mathematics P2 2025
Mark Scheme

Qn	Solutions	Marks	Marker's Comments
1(a)	$-5 < 2x-3 \le 7$ $-5 < 2x-3$ $\qquad 2x-3 \le 7$ $-1 < x$ $\qquad x \le 5$ $-1 < x \le 5$ Prime numbers are 2, 3, 5.	M1 M1 A1	Many students did not combine final inequality to $-1 < x \le 5$. Avoid doing by guess-and-check. Form simultaneous inequalities to solve. Those who simply wrote 2, 3, 5 get a maximum of 2 marks. Some still think that negative numbers and '1' are prime.
1(b)	$\frac{18c^3d^3}{5f^3} \div \frac{3c^5d^2}{10f}$ $= \frac{18c^3d^3}{5f^3} \times \frac{10f}{3c^5d^2}$ $= \frac{12d}{c^2f^2}$	B2 (deduct 1 m for 1 error)	No mark awarded for 'keep, change, flip'.
1(c)	$\left(\frac{16y^8}{81x^{12}}\right)^{-\frac{3}{4}}$ $= \left(\frac{3^4x^{12}}{2^4y^8}\right)^{\frac{3}{4}}$ $= \frac{27x^9}{8y^6}$	M1 A1	Cannot have a fraction within another fraction. That is not simplified.

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1(d)	$\frac{3x}{(2x-1)^2}-\frac{2}{2x-1}$ $=\frac{3x-2(2x-1)}{(2x-1)^2}$ $=\frac{3x-4x+2}{(2x-1)^2}$ $=\frac{-x+2}{(2x-1)^2}$	M1 A1	$(2x-1)^2 \neq (2x-1)(2x+1)$ Many still get this Sec 2 identity mixed up.
2 (a)(i)	$\mathbf{T}=5\begin{pmatrix}20 & 32 & 15\\ 15 & 35 & 18\end{pmatrix}\begin{pmatrix}1\\1\\1\end{pmatrix}$ $\mathbf{T}=5\begin{pmatrix}67\\68\end{pmatrix}$ $\mathbf{T}=\begin{pmatrix}335\\340\end{pmatrix}$	M1 A1	1 mark awarded for matrix multiplication without $\begin{pmatrix}1\\1\\1\end{pmatrix}$ matrix.
(a)(ii)	The elements represent the <u>total number of mangoes, apples and oranges</u> sold by seller *A* and *B* respectively in <u>5 days</u>.	B1	"Weekdays" not allowed. It is '5 days', "weekday" or "weekend" not mentioned. **Total** number, not **average** number.
(b)(i)	$\mathbf{C}=\begin{pmatrix}80 & 70\\ 50 & 40\\ 60 & 50\end{pmatrix}$ or $\mathbf{C}=\begin{pmatrix}0.80 & 0.70\\ 0.50 & 0.40\\ 0.60 & 0.50\end{pmatrix}$	B1	
(b)(ii)	$\mathbf{P}=\begin{pmatrix}20 & 32 & 15\\ 15 & 35 & 18\end{pmatrix}\begin{pmatrix}80 & 70\\ 50 & 40\\ 60 & 50\end{pmatrix}$ $\mathbf{P}=\begin{pmatrix}4100 & 3430\\ 4030 & 3350\end{pmatrix}$ or $\begin{pmatrix}41.00 & 34.30\\ 40.30 & 33.50\end{pmatrix}$	A1 for 2 correct elements A2 for 4 correct elements	

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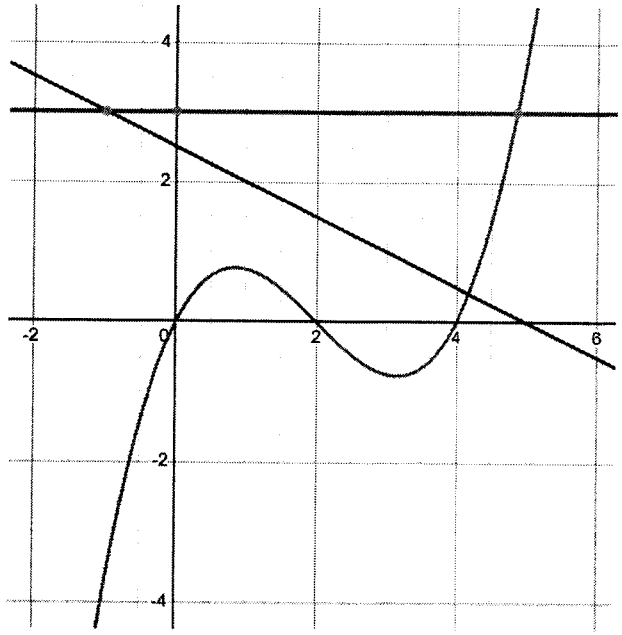
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(b)(iii)	Seller *A* receives a <u>total of \$41 while seller *B* receives \$33.50.</u> <u>Seller *A* made a higher profit</u>.	B1	"Total **sales**/total **revenue**" not "total selling price"
(c)	$\mathbf{N} = \begin{pmatrix} 0.8 & 0 & 0 \\ 0 & 0.9 & 0 \\ 0 & 0 & 1 \end{pmatrix}\begin{pmatrix} 80 & 70 \\ 50 & 40 \\ 60 & 50 \end{pmatrix}$ $\mathbf{N} = \begin{pmatrix} 64 & 56 \\ 45 & 36 \\ 60 & 50 \end{pmatrix}$	M1 A1	Many still do not know that the **orders** of matrices are important for matrix multiplication.
3(a)	Gradient of $PR = \frac{17-(-1)}{7-(-2)}$ $= 2$ Gradient of $SQ = -\frac{1}{2}$ Equation of SQ: $y = -\frac{1}{2}x + c$ Sub $S(20,3)$ $3 = -\frac{1}{2}(20) + c$ $c = 13$ Equation of SQ: $y = -\frac{1}{2}x + 13$	M1 M1 M1 A1	Error carried forward (ecf) maximum of 2 marks.

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(b)	$\sqrt{[5-(-4)]^2+(3-h)^2}=15$ $9^2+(3-h)^2=225$ $(3-h)^2=144$ $3-h=12$ or $3-h=-12$ $h=-9$ or $h=15$ Since $h>0$, $h=15$	M1 M1 A1	$\sqrt{81+(h-3)^2}\neq 9+(h-3)$!!! For example, $\sqrt{81+25}=10.3$ correct $\sqrt{81+25}=\sqrt{9+5}=\sqrt{14}=3.74$ incorrect!!!
(c)	$2x+ky-6=0$ $y=-\frac{2}{k}+\frac{6}{k}$ $\frac{6}{k}=-2$ $k=-3$	 M1 A1	Many wrote $2x+ky-6=-2$!! '-2' is the y-intercept, so you should substitute $(0,-2)$ into the **original** equation $2x+ky-6=0$.

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4(a)	0.66	B1	Quite a few did not follow 2 d.p. required!!
(b)		P2 – pts plotted correctly C1 – smooth curve	Some curved were not even S-shaped! A cubic graph is S-shaped. Usually a result of one or two pointed incorrectly plotted. Do not extend your graph beyond the first and last points in the table. It is a **curve**. No part should be linear/straight-line. Many curves were not smooth; some parts had "double lines". Some were using pencils not sharpened or not dark enough. Some lost marks as curve did not go through the middle of the plotted X.
(c)	$x^3 - 6x^2 + 8x = 12$ $x\left(x^2 - 6x + 8\right) = 12$ $\frac{x}{4}\left(8 - 6x + x^2\right) = 3$ Draw the line $y = 3$ From the graph, $x = 4.9 \pm 0.1$	M1 A1	Poorly done.

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(d)(i)	Line $L: y=-\frac{1}{2}x+c$ Sub (3,1), $1=-\frac{1}{2}(3)+c$ $c=2\frac{1}{2}$ $y=-\frac{1}{2}x+\frac{5}{2}$	B1 for eq B1 for drawing line or B2 for drawing line	Poorly done.
(ii)	From the graph, $x=4.2\pm0.1$	B1	Poorly done. Some wrote **unreadable** answers. You can only read to the accuracy of half the smallest box.
(iii)	$\frac{x}{4}\left(8-6x+x^2\right)=-\frac{1}{2}x+\frac{5}{2}$ $x\left(8-6x+x^2\right)=-2x+10$ $x^3-6x^2+10x-10=0$ $A=-6, B=10, C=-10$	M1 A2 for 3 answers	Poorly done.

5(a)	$HB^2=5.4^2+3.1^2-2(5.4)(3.1)\cos128°$ $HB=\sqrt{59.382346}$ $HB=7.705994$ $HB=7.71$ km (to 3 s. f.)	M1 A1	

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(b)	$\angle HCA = 180° - 133° = 47°$ $\frac{5.4}{\sin 47°} = \frac{6.5}{\sin \angle CHA}$ $\sin \angle CHA = \frac{6.5 \sin 47°}{5.4}$ $\angle CHA = 61.68256°$ $\angle CAH = 133 - 61.68256°$ $\angle CAH = 71.31744$ $\angle CAH = 71.3°$ (to 1 d.p.) (shown)	M1 M1 A1	When question asks for a number to "show", you need to show the **unrounded** number before the rounded number that you are aiming to get.
(c)	Draw North line at A $\angle NAH = 180° - 61.7° = 118.3°$ (int $\angle s$) Bearing of B from $A = 360° - 128° - 118.3°$ $= 113.7°$	M1 A1	Poor presentation in finding bearings. Many still rounded to 3 s.f.
(d)	$\tan 14° = \frac{h}{3.1}$ $h = 0.772917$ km $\tan \theta = \frac{0.772917}{6.5}$ $\theta = 6.8°$ (to 1 d.p.) angle of elevation = 6.8°	M1 M1 A1	A few students have ecf mark(s) here.

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6(a)	Time taken to travel from A to B $= \frac{12}{x-3}$ h Time taken to travel from B to C $= \frac{9}{x+3}$ h $\frac{12}{x-3}+\frac{9}{x+3}=1\frac{1}{4}$ $\frac{12(x+3)+9(x-3)}{(x-3)(x+3)}=\frac{5}{4}$ $48x+144+36x-108=5(x^2-9)$ $84x+36=5x^2-45$ $5x^2-84x-81=0$ (shown)	M1 A1 M1 M1 A1	Many students were not able to connect speed, distance and time to form an equation.
(b)	$x=\frac{84\pm\sqrt{(-84)^2-4(5)(-81)}}{2(5)}$ $x=\frac{84\pm\sqrt{8676}}{10}$ $x=17.7145$ or -0.91450 $x=17.71$ or -0.91	M1 A1, A1	Some students failed to give the answers correct to 2 d.p.
(c)	The solution $x = -0.91$ must be rejected, as it results in the speed x km/h, to be a negative value.	B1	Some students took x to be time rather than speed.
(d)	Difference $=\left(\frac{12}{17.7145-3}-\frac{9}{17.7145+3}\right)$ h $= 0.381044$ h $= 22.8626$ min $= 22$ min 52 sec	M1 A1	Some used the 3 s.f. value of 17.7 to find the difference in time. This resulted in inaccurate answer. Some students do not know how to convert minutes to minutes and seconds.

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7(a(i)	$100 < p \leq 120$	B1	Most were able to get the correct interval.
(ii)	125.6 mmHg	B1	Well done
(iii)	20.1 mmHg	B1	Well done
(iv)	The blood pressures of the second group of patients <u>is less consistent than that of the first group of patients, since it has a higher SD compared to the first group.</u>	B1	Good. Many correctly used the terms 'less consistent' or 'more consistent'.
(b)(i)	Group B: 142, 153, y, 157, 158, 160, 162, 164, 178 $Q_3 = \frac{162+164}{2} = 163$ $163 - Q_1 = 10$ $Q_1 = 153$ $Q_1 = \frac{153+y}{2} = 153$ $y = 153$ $x = 3$ (shown)	M1 M1 A1	Poorly done. A number of students gave wrong presentations: $15x$ means 15 multiplied by x. $Q_1 = \frac{153+15x}{2} = 153$ $15x = 306 - 153$ $15x = 153$ $x = 3$ Wrong interpretation: x is not the height $Q_1 = \frac{153+x}{2} = 153$ $x = 306 - 153$ $x = 153$ $x = 3$
(ii)	Prob $= \frac{5}{10} = \frac{1}{2}$	B1	$\frac{7}{10}$ was a common answer, not realising that lengths 152 cm and 164 cm are not included.
(iii)	Prob $= \frac{5}{10} \times \frac{3}{9} + \frac{2}{10} \times \frac{3}{9}$ $= \frac{7}{30}$	M1 A1	Many had only one possible outcome, $\frac{5}{10} \times \frac{3}{9}$, not realizing that there was another possible outcome.

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8(a(i)	$\angle BAC = \angle DAB$ (common) $\angle ACB = 90°$ (angle in semicircle) $\angle ABD = 90°$ (angle in semicircle) $\angle ACB = \angle ABD$ Triangle ABC is similar to triangle ADB (AA Similarity Test)	M1 A1 (only if both proofs are given)	Poorly done. Instead of proving 2 pairs of equal angles, answers such as AB is common were seen. Some proved 1 pair of equal angles only and concluded that the 2 triangles were similar.
(ii)	$\frac{AB}{AC} = \frac{AD}{AB}$ $\frac{AB}{6} = \frac{18}{AB}$ $AB^2 = 108$ $AB = 10.4$ cm (to 3 s. f.)	M1 A1	Poorly done. Didn't apply ratio of sides to find AB. Some correctly used Pythagoras Theorem. Diameter, $AD = 18$ cm Radius, $PB = 9$ cm, $CP = 3$ cm Found CB and AB
(b)	$OD = 12$ cm $\angle OCD = 90°$ (tangent perpendicular to radius) $\cos \angle COD = \frac{8}{12}$ $\angle COD = 0.841069$ rad Area of sector $COE = \frac{1}{2}(8)^2(0.841069)$ $= 26.9142$ cm^2 Area of $\Delta COD = \frac{1}{2}(8)(12)\sin 0.841069$ $= 35.7771$ cm^2 Shaded area $= 2 \times (35.7771 - 26.9142)$ $= 17.7$ cm^2 (to 3 s.f.)	M1 M1 M1 M1 A1	Some wrongly assumed $\angle AOB = \angle BOC = \angle COD = 60°$. Some wrongly calculated Area of $\Delta COD = \frac{1}{2}(8)(12)$. Many left this question blank.

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<table>
<tr><td>9(a(i)</td><td>Average monthy usage
$= \frac{1007.8+1166.3+1133.6+1249+1248.5+1282.6}{6}$
$= 1181.3$ kWh</td><td>M1

A1</td><td>Most were able to get this right.
Some approximated the correct answer to 3 s.f.</td></tr>
<tr><td>(ii)</td><td>Average monthy cost $= 1181.3 \times \$0.2812 \times 1.09$
$= \$362.08$ (2 d.p.)</td><td>M1
A1</td><td>Many were able to do this.
Some left the answer in cents, even though answer line showed dollar sign.</td></tr>
<tr><td>(b)</td><td><table><tr><td></td><td></td><td>Total number of solar panels</td></tr><tr><td>9 m ÷ 1.65 m = 5.4545 ≈ 5</td><td>4 m ÷ 1 m = 4</td><td>5 × 4 = 20</td></tr><tr><td>9 m ÷ 1 m = 9</td><td>4 m ÷ 1.65 m = 2.4242 ≈ 2</td><td>9 × 2 = 18</td></tr></table>Maximum number of solar panels = 20</td><td>M1

A1</td><td>Few got the correct number of solar panels.

Many wrongly divided (9 m by 4 m) with (1.65 m by 1 m) and got an answer of $21.8 \approx$ 21 or 22 panels.</td></tr>
<tr><td>(c)</td><td>Amount of electricity produced by solar panels per month
= 45 kWh × 20 solar panels = 900 kWh

Average amount of electricity used per month after installation
= 1181.3 kWh – 900 kWh = 281.3 kWh

Average cost of electricity per month after installation
= 281.3 kWh × $\$0.2812 \times 1.09 = \$86.22$

Average cost of solar panels per month
$= \frac{10250 \times 2}{25 \text{ years} \times 12 \text{ months}} = \$68.33$

Total average cost of electricity per month after installation
= \$86.22 + \$68.33
= \$154.55 < \$362.08 (from ii)
Since the average cost of electricity per month paid by Chan after installing the solar panels will be less than what he is currently paying, he should go ahead and install the solar panels.</td><td>

EU1

EC1

SP1

CE1

A1</td><td>Ecf from parts (a) and (b)

There were some students who got full 5 marks from Ecf.

Some left this question blank.</td></tr>
</table>

BP~695

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	Solution (values calculated per **year**) Amount of electricity produced by solar panels per **year** = 10800 kWh Average amount of electricity used per **year** after installation = 3375.6 kWh Average cost of electricity per **year** after installation = \$1034.64 Average cost of solar panels per **year** $= \frac{10250 \times 2}{25 \text{ years}} = \$820$ Total average cost of electricity per **year** after installation = \$1034.64 + \$820 = \$1854.64 < \$362.08 ×12 (from ii) Since the average cost of electricity per **year** paid by Chan after installing the solar panels will be less than what he is currently paying, he should go ahead and install the solar panels. **Solution** (values calculated for **25 years**) Amount of electricity produced by solar panels for **25 years** = 270000 kWh Average amount of electricity used for **25 years** after installation = 84390 kWh Average cost of electricity for **25 years** after installation = \$25866 Average cost of solar panels for **25 years** = \$20500 Total average cost of electricity for **25 years** after installation = \$25866+ \$20500 = \$46366 < 108624 Since the average cost of electricity for **25 years** paid by Chan after installing the solar panels will be less than what he is currently paying, he should go ahead and install the solar panels.		

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