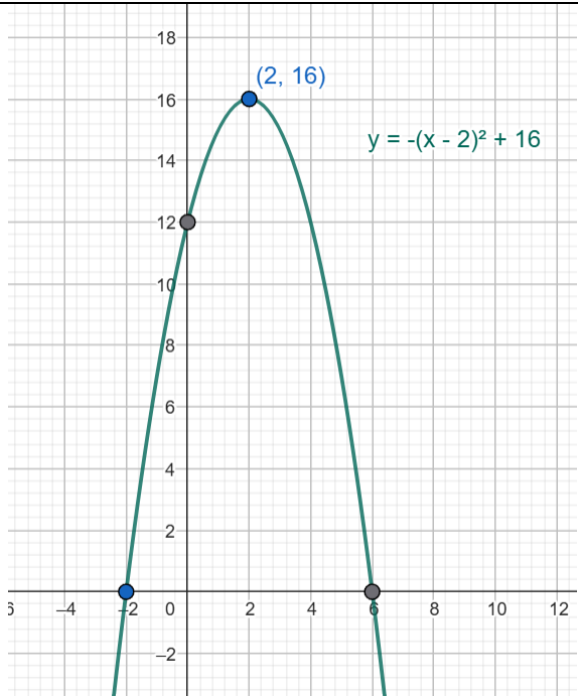
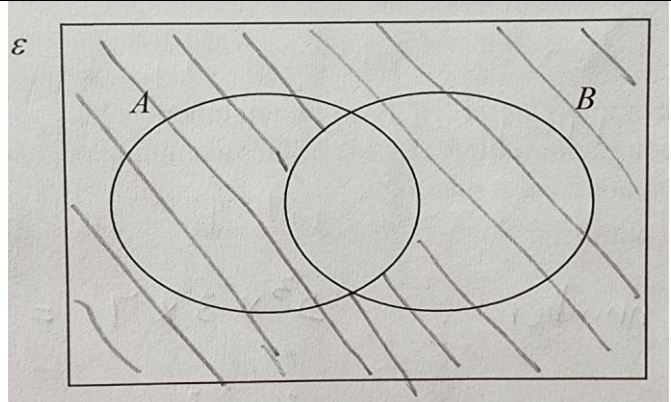


Yio Chu Kang Secondary School
4E/5N Prelim Mathematics P1 2025
Marking Scheme

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	$x < 0$ or $x \geq 3$	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</u> or <u>less than</u> the mark.	B1	Poor
5a	$24pq^2 + 15pq - 9p^2q$ $= 3pq(8q + 5 - 3p)$	B1	
5b	$5 + 2a^2bc - 5ac - 2ab$ $= 5 - 5ac + 2a^2bc - 2ab$ $= 5(1 - ac) - 2ab(1 - ac)$ $= (1 - ac)(5 - 2ab) \quad \text{accept } (ac - 1)(2ab - 5)$	M1 A1	
6a	$1.25 \text{ km} : 1 \text{ cm}$ $1 \text{ km} : \frac{1}{1.25} \text{ cm}$ $10 \text{ km} : \frac{10}{1.25} = 8 \text{ cm}$	M1 A1	Poor conversion of units
6b	$1 \text{ cm}^2 : 1.25^2 \text{ km}^2 = 1.5625 \text{ km}^2$ $6.56 \text{ cm}^2 : 6.56 \times 1.25^2 \text{ km}^2 = 10.25 \text{ km}^2$	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

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

13	$8x - 3y = 25 \text{ ----- (1)}$ $12x + 5y = 9 \text{ ----- (2)}$ $(1) \times 5, \quad 40x - 15y = 125 \text{ ----- (3)}$ $(2) \times 3, \quad 36x + 15y = 27 \text{ ----- (4)}$ $(3) + (4), \quad 76x = 152$ $x = 2$ $y = -3$	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

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	$(6.3 \times 10^{500}) + (8.17 \times 10^{501})$ $= (6.3 + 81.7) \times 10^{500}$ $= 88 \times 10^{500}$ $= 8.8 \times 10^{501}$	M1 A1	Most of the students who did not get b(i) correctly will not be able to solve b(ii) as well.
18i	$504 = 2^3 \times 3^2 \times 7$	B1	Generally well done
18ii	1 st number : $(2^2 \times 3 \times 7) \times 2 = 168$ 2 nd number : $(2^2 \times 3 \times 7) \times 3 = 252$	B2	Generally ok. Those who did not answer correctly were mainly because they did not understand HCF and LCM fully.
19	$x = 25.277^\circ$ or $180^\circ - 25.277^\circ$ $x = 25.3^\circ$ or 154.7°	B2	Many did not correct to 1 dp for degrees
20a	$1944 = D + 66 \times 24$ $D = 1944 - 1584$ $= \$360$	M1 A1	Generally ok
20b	<i>Int :</i> $1944 - 1800 = \frac{(1800 - 360)(R)(2)}{100}$ $R = \frac{144 \times 100}{1440 \times 2} = 5$	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.

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.

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	$x^2 + 16x + 18 = 0$ $(x + 8)^2 - 8^2 = -18$ $(x + 8)^2 = -18 + 64$ $x + 8 = \pm\sqrt{46}$ $x = -1.22(2dp) \text{ or } -14.78(2dp)$	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.

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 $\square$ 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.

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 $\overrightarrow{AF} = \frac{9}{5}\overrightarrow{AE}$ & <u>A is a common point</u>, 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	$\frac{1}{2} \times 30 = 15\text{cm}^2$	B1	Generally ok.