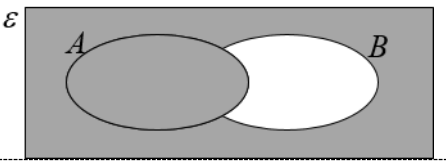
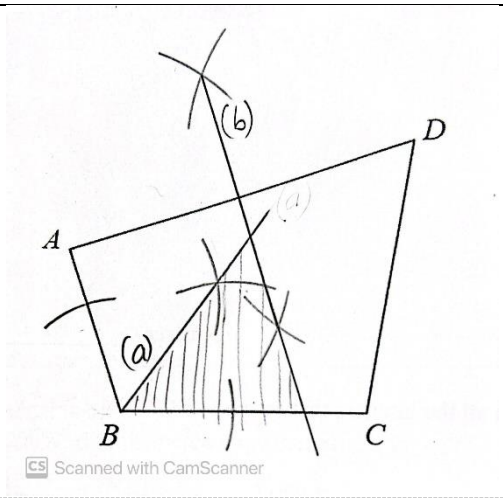
Anglo-Chinese School (Barker Road)

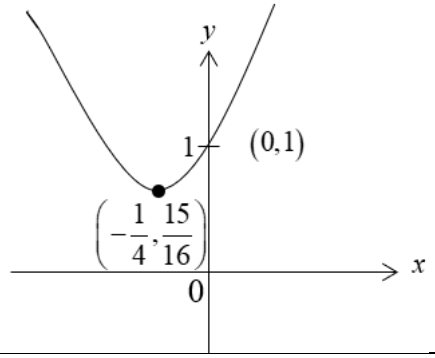
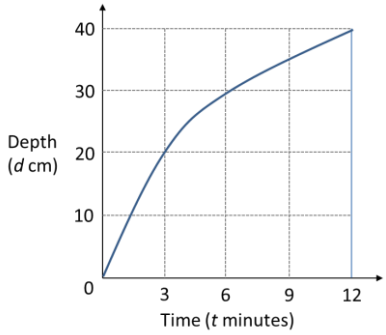
Mathematics Paper 1 Marking Scheme
Secondary 4 Express / 5 Normal Academic
Preliminary Exams 2024

Qn		Steps/Answer	Remarks
1		$\sqrt{0.81}$ 0.902 $0.86^{\frac{2}{3}}$ $\frac{399}{441}$	
2		$=\frac{7x}{(x-5)^2}-\frac{1}{x-5}$	Also accept $\frac{7x}{(5-x)^2}+\frac{1}{5-x}$
		$=\frac{7x-(x-5)}{(x-5)^2}$	$=\frac{7x+5-x}{(5-x)^2}$
		$=\frac{6x+5}{(x-5)^2}$	$=\frac{6x+5}{(5-x)^2}$
3		$(254.9\times10^9)\div(2.45\times10^6)$	Accept $(254\times10^9)\div(2.45\times10^6)$ or higher accuracy
		$= 1.04\times10^5$	
4		$\frac{5c}{2}\div\frac{20c^2}{d}$	
		$=\frac{5c}{2}\times\frac{d}{20c^2}$	
		$=\frac{d}{8c}$	
5		$\frac{9kx^2-kx^2}{kx^2}\times100\%$	
		= 800%	
6		(3-2) units -> \$20	
		Total 9 units -> \$180	
7	(a)	$-8\le 2-3x$ and $2-3x<7-\frac{1}{2}x$	
		$-10\le -3x$ and $-5<2\frac{1}{2}x$	
		$-2<x\le 3\frac{1}{3}$	cannot accept 3.33
	(b)	-1, 0, 1, 2, 3	
8	(a)		
	(bi)	$7 \notin B$	
	(bii)	$\{3,7\} \subset A$	

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9		Scanned with CamScanner	Construction arcs are to be clearly seen.
		Correct angle bisector	
		Correct perpendicular bisector	
		Correct region shaded	
10		$(2p+1)(p-2)=0$	Accept $(2p+1)(3p-6)=0$
		$p=-\frac{1}{2}, p=2$	
11		Cost price of watch for Jimmy = $\frac{80}{100}\times 210$ $=\$168$	
		Profit price = $\frac{120}{100}\times\$168$ $=\$201.60$	
		Marked price = $\frac{100}{90}\times\$201.60=\$224$	
12	(a)	Total time taken $=15+5+5=25$ min	
		Yes, he will achieve his target as he will complete by **09 15.**	
	(b)	$\frac{2.3\times1000}{25}$	
		= 92 m/min	
13	(a)	$\frac{200}{V}=(\frac{1.49}{1})^3$	
		V = 60g	
	(b)	Different **vertical scales/intervals** are used.	
14	(a)	$1260=2^2\times3^2\times5\times7$	
	(b)	84 and 180	
	(c)	$m=3, n=2$	

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15	(a)	$x^2+\frac{1}{2}x+1$ $=\left(x+\frac{1}{4}\right)^2+\frac{15}{16}$	
	(b)		
16	(a)	$\mathbf{V}=\begin{pmatrix}320 & 120\\ 380 & 100\\ 410 & 130\end{pmatrix}$	
	(b)	$\mathbf{C}=\begin{pmatrix}2\\ 0.5\end{pmatrix}$	
	(c)	$\mathbf{P}=\begin{pmatrix}700\\ 810\\ 885\end{pmatrix}$	
	(d)	**A** represents the average ERP charges collected across the three days.	
17	(a)	$\frac{\frac{1}{2}\times base\times 20\times width}{\frac{1}{2}\times(2\times base)\times 40\times width}\times 12$	or $\left(\frac{20}{40}\right)^2\times 12$
		= 3 min	
	(b)		

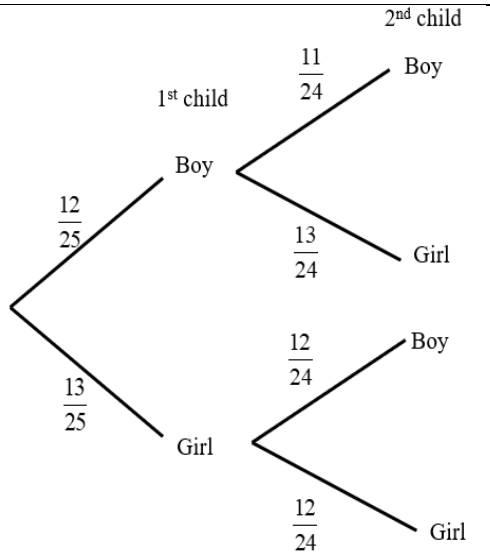
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18		$QP = \dfrac{8}{\tan 0.7 rad} = 9.4979$	
		Area of triangle OPQ = $\dfrac{1}{2}(8)(9.4979) = 37.992$	
		Area of sector = $\dfrac{1}{2}\left(8^2\right)\left(\dfrac{\pi}{2} - 0.7\right) = 27.865$	
		Area of shaded region = 10.1 cm^2	
19	(a)	$\dfrac{1}{2}(6)v + (18-6)v + \dfrac{1}{2}(23-18)v = 385$	
		$v = 22$ m/s	
	(b)	$\dfrac{30-0}{T-35} = \dfrac{25-0}{45-35}$	$\dfrac{10}{2} = 2$ or
		$30(10) = 25(T-35)$	
		$T = 47$s	or 45+2=47
20	(a)	angle PBC = angle QBR (common angle) angle BQR = angle BPC (corr. angles, $PC//QR$)	
		Triangle PCB and triangle QRB are similar (AA test)	
	(b)	Triangles ABC and QRC *or* Triangles ABQ and CPQ	
	(c)	$\dfrac{CR}{CB} = \dfrac{3}{7}$	
		$\dfrac{QR}{PC} = \dfrac{BR}{BC}$ $\dfrac{3}{PC} = \dfrac{4}{7}$	
		$PC = 5.25$	

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21	(a)	$\left(\frac{4a^6}{b^4}\right)^{-\frac{1}{2}}$	
		$=\left(\frac{b^4}{4a^6}\right)^{\frac{1}{2}}$	
		$=\frac{b^2}{2a^3}$	
	(b)	$\frac{2^k}{\sqrt[4]{8}}=4^{2k}$	
		$\frac{2^k}{2^{\frac{3}{4}}}=2^{4k}$	
		$k=4k+\frac{3}{4}$	
		$k=-\frac{1}{4}$	
22	(a)	$T_n=n(n+1)+10-4(n-1)$ $=n^2+n+10-4n+4$ $=n^2-3n+14$	
	(b)	$T_{50}=2364$	
	(c)	$n^2-3n+14=n(n-3)+14$	
		When n is even n(n-3) is (even x odd) = even. When n is odd, n(n-3) is (odd x even) = even. Adding to 14 which is also even, $T_n=n^2-3n+14$ will always be even for all terms.	
23	(a)	$\angle EDC=\angle BAE=\frac{(5-2)\times 180}{5}=108°$	
		$\angle AEB=\frac{180-108}{2}=36°$	
		$\angle BED=108-36=72°$	
		$\angle BED+\angle EDC=72+108=180°$	
		By the converse of interior angles, *BE* is parallel to *CD*	
	(b)	$\angle EBX=180-36=144°$	Or equivalent methods, with correct reasoning. (eg ***BE*//*CX*** and a pair of opposite equal angles)
		$\angle BEC=108-36-36=36°$	
		As $\angle EBX+\angle BEC=180°$, by the converse/property of **interior angles**, *EC*//*BX*.	
		BECX is a rhombus as ***BE*//*CX (or DX)*** and ***EC*//*BX*** and adjacent sides *BE=EC*.	

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24	(ai)	5	
	(aii)	Gradient of PQ = $\frac{-3}{4}$	
		$-2=\frac{-3}{4}(8)+c$	
		$c=4$	
		Equation is $y=\frac{-3}{4}x+4$	
	(b)	$2\left(\frac{-3}{4}x+4\right)-4x=19$	Or elimination method correctly follow-thru from a(ii)
		$x=-2, y=5.5$	
		$(-2,5.5)$	
25	(a)		
	(b)	$\left(\frac{12}{25}\right)\left(\frac{11}{24}\right)=\left(\frac{11}{50}\right)$	
	(c)	$\left(\frac{13}{25}\right)\left(\frac{12}{24}\right)\times 2$	
		$=\left(\frac{13}{25}\right)$	
	(d)	$1-\left(\frac{12}{25}\right)\left(\frac{11}{24}\right)\left(\frac{10}{23}\right)-\left(\frac{13}{25}\right)\left(\frac{12}{24}\right)\left(\frac{11}{23}\right)$ or P(BBG)+P(BGB)+P(GBB)+P(GGB)+P(GBG)+P(BGG) $=\left(\frac{12}{25}\right)\left(\frac{11}{24}\right)\left(\frac{13}{23}\right)\times 3+\left(\frac{13}{25}\right)\left(\frac{12}{24}\right)\left(\frac{12}{23}\right)\times 3$	
		= 0.78 or $\left(\frac{39}{50}\right)$	

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