Trigonometry Non-Calculator A/B Grade

[SQA] 1.

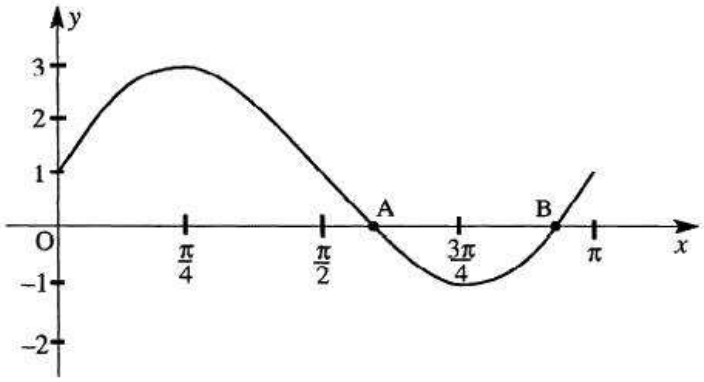
(*a*) Solve $\cos 2x^\circ - 3\cos x^\circ + 2 = 0$ for $0 \leq x < 360$. **5**

(*b*) Hence solve $\cos 4x^\circ - 3\cos 2x^\circ + 2 = 0$ for $0 \leq x < 360$

Part	Marks	Level	Calc.	Content	Answer	U2 OC3
(*a*)	5	C	NC	T7	$x = 0, 60, 300$	2011 P1 Q23
(*b*)	2	A	NC	T11	$x = 0, 30, 150, 180, 210, 330$	

•[1] ss: know to use double angle formula •[2] ic: express as a quadratic in $\cos x^\circ$ •[3] ss: start to solve •[4] pd: reduce to equations in cos only •[5] ic: process solutions in given domain •[6] ic: interpret relationship with (a) •[7] ic: interpret periodicity	•[1] $2\cos^2 x^\circ - 1 \ldots$ •[2] $2\cos^2 x^\circ - 3\cos x^\circ + 1 = 0$ •[3] $(2\cos x^\circ - 1)(\cos x^\circ - 1)$ •[4] $\cos x^\circ = \frac{1}{2}, 1$ •[5] $0, 60, 300$ •[6] $2x = 0$ and 60 and 300 •[7] 0, 30, 150, 180, 210 and 330

[SQA] 2. The diagram below shows the graph of $y = 2\sin 2x + 1$ for $0 \le x \le \pi$.



(*a*) Find the coordinates of A and B (as shown in the diagram) by solving an appropriate equation algebraically. **(5)**

(*b*) The points (0, 2) and (π, 0) are joined by a straight line *l*. In how many points does *l* intersect the given graph ? **(1)**

(*c*) C is the point on the given graph with an x-coordinate of $\frac{\pi}{2}$. Explain whether C is above, below or on the line *l*. **(3)**

Part	Marks	Level	Calc.	Content	Answer	U2 OC3
(*a*)	3	C	NC	T7		1993 P2 Q6
(*a*)	2	A/B	NC	T7		
(*b*)	1	C	NC	CGD		
(*c*)	3	A/B	NC	CGD		

(*a*) •1 $2\sin 2x + 1 = 0$

•2 $\sin 2x = -\frac{1}{2}$

•3 for any valid sol of equ. in form $\sin ax = -\frac{b}{c}$

•4 $\left(\frac{7\pi}{12}, 0\right)$

•5 $\left(\frac{11\pi}{12}, 0\right)$

(*b*) •6 3

(*c*) •7 $y_C = 1$

•8 for a strategy to make a decision about C

•9 for making a consistent decision about C

[SQA] 3. The graph of $y = f(x)$ passes through the point $\left(\frac{\pi}{9}, 1\right)$.
If $f'(x) = \sin(3x)$ express y in terms of x. **4**

Part	Marks	Level	Calc.	Content	Answer	U3 OC2
	4	A/B	NC	C18, C23	$y = -\frac{1}{3}\cos(3x) + \frac{7}{6}$	2000 P1 Q8

•1 ss: know to integrate •2 pd: integrate •3 ic: interpret $(\frac{\pi}{9}, 1)$ •4 pd: process	•1 $y = \int \sin(3x)\,dx$ *stated or implied by* •2 •2 $-\frac{1}{3}\cos(3x)$ •3 $1 = -\frac{1}{3}\cos(\frac{3\pi}{9}) + c$ or equiv. •4 $c = \frac{7}{6}$

[END OF QUESTIONS]