

differentiate trig

[SQA] 1. Find the equation of the tangent to the curve $y = 2 \sin(x - \frac{\pi}{6})$ at the point where $x = \frac{\pi}{3}$. 4

Part	Marks	Level	Calc.	Content	Answer	U3 OC2
	4	C	CN	C5, C20	$y = \sqrt{3}x + 1 - \frac{\pi}{\sqrt{3}}$	2002 P2 Q6
•¹ pd: find derivative •² ss: know derivative at $x = \dots$ represents grad. •³ pd: find corresponding y-coordinate •⁴ ic: state equation of tangent					•¹ $\frac{dy}{dx} = 2 \cos(x - \frac{\pi}{6})$ •² $m = \sqrt{3}$ •³ $y_{x=\frac{\pi}{3}} = 1$ •⁴ $y - 1 = \sqrt{3}(x - \frac{\pi}{3})$	

[SQA] 2. Differentiate $\sin 2x + \frac{2}{\sqrt{x}}$ with respect to x . 4

Part	Marks	Level	Calc.	Content	Answer	U3 OC2
	2	C	NC	C3		1989 P1 Q10
	2	A/B	NC	C20		

$\bullet^1 2x^{-\frac{1}{2}}$
 $\bullet^2 \cos 2x$
 $\bullet^3 \times 2$
 $\bullet^4 -x^{-\frac{3}{2}}$

[SQA] 3. Given $f(x) = \cos^2 x - \sin^2 x$, find $f'(x)$. 3

Part	Marks	Level	Calc.	Content	Answer	U3 OC2
	1	C	NC	C21		1999 P1 Q19
	2	A/B	NC	C21, C20		

$\bullet^1 f(x) = \cos 2x$ $\bullet^2 -\sin 2x$ $\bullet^3 \times 2$		For $\frac{d}{dx}(\cos^2 x)$ $\bullet^1 2\cos x$ $\bullet^2 \times -\sin x$ For $\frac{d}{dx}(-\sin^2 x)$ $\bullet^3 -2\sin x \times \cos x$	OR	For $\frac{d}{dx}(-\sin^2 x)$ $\bullet^1 -2\sin x$ $\bullet^2 \times \cos x$ For $\frac{d}{dx}(\cos^2 x)$ $\bullet^3 2\cos x \times -\sin x$
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[SQA]

4. Find $\frac{dy}{dx}$ given that $y = \sqrt{1 + \cos x}$.

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Part	Marks	Level	Calc.	Content	Answer	U3 OC2
	3	A/B	NC	C21, C20		1996 P1 Q13

- ¹ $(1 + \cos x)^{\frac{1}{2}}$ stated or implied by •²
- ² $\frac{1}{2}(1 + \cos x)^{-\frac{1}{2}}$
- ³ $\times -\sin x$

[SQA]

5. Given $f(x) = (\sin x + 1)^2$, find the exact value of $f'(\frac{\pi}{6})$.

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Part	Marks	Level	Calc.	Content	Answer	U3 OC2
	3	A/B	NC	C21, C20, T2		1998 P1 Q16

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|--------------------------------------|-------------|--|
| • ¹ $2(\sin x + 1)$ | Alternative | • ¹ expand and differentiate $2 \sin x + 1$ |
| • ² $\times \cos x$ | | • ² differentiate $\sin^2 x$ |
| • ³ $\frac{3\sqrt{3}}{2}$ | | • ³ $\frac{3\sqrt{3}}{2}$ |

[END OF QUESTIONS]