



GCE A LEVEL MARKING SCHEME

SUMMER 2022

**A LEVEL (NEW)
MATHEMATICS
UNIT 3 PURE MATHEMATICS B
1300U30-1**

INTRODUCTION

This marking scheme was used by WJEC for the 2022 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

SUMMER 2022 MARK SCHEME

Q	Solution	Mark	Notes
1	$6(1 + \tan^2 x) - 8 = \tan x$	M1	use of $\sec^2 x = 1 + \tan^2 x$ Must be seen for M1
	$a \tan^2 x + b \tan x + c = 0$		
	$6 \tan^2 x - \tan x - 2 = 0$		
	$(A \tan x + B)(C \tan x + D) = 0$	m1	$AC = a$ and $BD = c$, $c \neq 0$ oe
	$(3 \tan x - 2)(2 \tan x + 1) = 0$		
	$\tan x = -\frac{1}{2}, \frac{2}{3}$	A1	cao
	$\tan x = \frac{2}{3}, x = 33.69^\circ, 213.69^\circ$	B1	first 2 correct solutions Condone 0.588 ^c , 3.730 ^c
	$\tan x = -\frac{1}{2}, x = 153.43^\circ,$	B1	3 rd correct solution Condone 2.678 ^c
	$x = 333.43^\circ$	B1	4th correct solution Condone 5.820 ^c

Accept all answers correctly rounded to the nearest whole number or better.

Q	Solution	Mark	Notes
2(a)	$y = x^3 \ln(5x)$		
	$\frac{dy}{dx} = 3x^2 \ln(5x) + x^3 \frac{5}{5x}$	M1	$f(x) \ln(5x) + x^3 g(x)$
			M0 if $f(x) = 0$ or 1 or $g(x) = 0$ or 1
		A1	$3x^2 \ln(5x)$
		A1	$x^3 \frac{5}{5x}$
			ISW
	$\frac{dy}{dx} = 3x^2 \ln(5x) + x^2 = x^2(3 \ln(5x) + 1)$		
2(b)	$y = (x + \cos 3x)^4$		
	$\frac{dy}{dx} = 4(x + \cos 3x)^3(1 - 3 \sin 3x)$	M1	$4(x + \cos 3x)^3 f(x)$
			M0 if $f(x) = 1$
		A1	$f(x) = (1 - 3 \sin 3x)$
			Condone absence of brackets
			for M1 A0, unless corrected for A1.
			ISW

Q	Solution	Mark	Notes
3	$OB \left(= \frac{4}{\cos \frac{\pi}{3}} \right) = 8$ or $OA \left(= \frac{4}{\tan 30^\circ} \right) = 4\sqrt{3}$	B1	si ($OA = 6.928\dots$)
	$\text{Area } OAB = \frac{1}{2} \times 4 \times 8 \sin \frac{\pi}{3}$ $= 8\sqrt{3} = 13.856\dots$	M1	Use of $A = \frac{1}{2} \times AB \times OA$
	$\text{Area } OBC = \frac{1}{2} \times 8 \times 8 \times \frac{\pi}{3}$ $= \frac{32\pi}{3} = 33.510\dots$	M1	Use of $A = \frac{1}{2}r^2\theta$ Or $A = \frac{1}{6}\pi r^2$ ft OB, OA
	Required area $OABC = 47.37 \text{ (m}^2\text{)}$	A1	cao Must be to 2dp

Q	Solution	Mark	Notes
4	$\frac{a}{1-r} = 120$	B1	si
	$\frac{a}{1-4r^2} = 112\frac{1}{2}$	B1	si
	$120(1-r) = \frac{225}{2}(1-4r^2)$	M1	or elimination of r
	$900r^2 - 240r + 15 = 0$ or $a^2 - 208a + 10800 = 0$	m1	attempt to solve their quadratic equation Implied by correct answers
	$60r^2 - 16r + 1 = 0$		
	$(6r - 1)(10r - 1) = 0$		
	$r = \frac{1}{6}, r = \frac{1}{10}$	A1	One correct pair, cao
	$a = 100, a = 108$	A1	all correct, cao

Q	Solution	Mark	Notes
5(a)	$\left(\frac{6x+4}{(x-1)(x+1)(2x+3)} = \right) \frac{A}{(x-1)} + \frac{B}{(x+1)} + \frac{C}{(2x+3)}$ $6x + 4 = A(x+1)(2x+3) + B(x-1)(2x+3) + C(x+1)(x-1)$ Put $x = -1, -2 = B(-2)(1)$ $B = 1$ Put $x = -\frac{3}{2}, -9 + 4 = C(-\frac{1}{2})(-\frac{5}{2})$ $C = -4$ Put $x = 1, 10 = A(2)(5)$ $A = 1$ $f(x) = \frac{1}{(x-1)} + \frac{1}{(x+1)} - \frac{4}{(2x+3)}$	M1	correct form Implied by equation below si correct equation two correct constants third constant correct
5(b)	$\int \frac{3x+2}{(x-1)(x+1)(2x+3)} dx$ $= \int \frac{1}{2} \left[\frac{1}{(x-1)} + \frac{1}{(x+1)} - \frac{4}{(2x+3)} \right] dx$ $= \frac{1}{2} [\ln x-1 + \ln x+1 - 2\ln 2x+3 (+\ln C)]$ $= \frac{1}{2} \left[\ln \left \frac{C(x+1)(x-1)}{(2x+3)^2} \right \right] \text{ or } \left[\ln \left \frac{\sqrt{C(x+1)(x-1)}}{(2x+3)} \right \right]$	B3	B1 correct int of $\frac{1}{(x-1)}$ B1 correct int of $\frac{1}{(x+1)}$ B1 correct int of $\frac{K}{(2x+3)}$ Condone no modulus signs for B3 attempt to tidy up into one ln term M0 if extra terms seen cao accept +C A0 if no C. ISW

Q	Solution	Mark	Notes
6(a)	$T_{12} = 10 + (12 - 1) \times 0.2$ $T_{12} = £12.20$	M1 A1	use of $a + (n - 1)d$ Allow $d = 20$ for M1. Implied by correct answer.
6(b)	$(954 =) \frac{n}{2} [2 \times 10 + (n - 1) \times 0.2]$ $9540 = n[100 + n - 1]$ $n^2 + 99n - 9540 = 0$ $(n - 60)(n + 159) = 0$ $n = 60$ 60 (months)	M1 m1 A1	use of $\frac{n}{2} [2a + (n - 1)d]$ Allow $d = 20$ for M1. equating to 954 and writing as quadratic Implied by $n = 60$ cao Dependent on M1 A0 if $n = -159$ present in final answer

Q	Solution	Mark	Notes
8	$\frac{2-x}{\sqrt{1+3x}} = (2-x)(1+3x)^{-1/2}$ $(1+3x)^{-1/2} = \left(1 + \left(-\frac{1}{2}\right)(3x) + \frac{\left(-\frac{1}{2}\right)\left(-\frac{3}{2}\right)}{2}(3x)^2 + \dots\right)$ $\frac{2-x}{\sqrt{1+3x}} = \left(2-x\right)\left(1 - \frac{3}{2}x + \frac{27}{8}x^2 + \dots\right)$ $= 2 - 3x + \frac{27}{4}x^2 - x + \frac{3}{2}x^2 + \dots$ $= 2 - 4x + \frac{33}{4}x^2 + \dots$ Expansion valid for $3x < 1$ $ x < \frac{1}{3} \quad \text{or} \quad -\frac{1}{3} < x < \frac{1}{3}$ When $x = \frac{1}{22}$, $\frac{2-\frac{1}{22}}{\sqrt{1+\frac{3}{22}}} \approx 2 - \frac{4}{22} + \frac{33}{4}\left(\frac{1}{22}\right)^2$ $\frac{\frac{43}{22}}{\frac{5\sqrt{22}}{22}} = \frac{43}{5\sqrt{22}} \approx \frac{323}{176} \quad \text{or} \quad \frac{43\sqrt{22}}{110} \approx \frac{323}{176}$ $\sqrt{22} \approx \frac{7568}{1615} \quad \text{or} \quad \frac{1615}{344}$ (= 4.686068111..., or 4.694767442..., actual value is 4.69041576...)	B1 B1 B3 B1 M1 A1	$1 + \left(-\frac{1}{2}\right)(3x)$ $\frac{\left(-\frac{1}{2}\right)\left(-\frac{3}{2}\right)}{2}(3x)^2$ B1 each term Ignore further terms, ISW B1 for $x < \frac{1}{3}$ and $x > -\frac{1}{3}$ B0 anything else sub into LHS and RHS cao

Special case for $(1 + 3x)^{1/2}$ used

$$(1 + 3x)^{1/2} = (1 + \left(\frac{1}{2}\right)(3x) + \frac{\left(\frac{1}{2}\right)\left(-\frac{1}{2}\right)}{2}(3x)^2 + \dots)$$

(B0)

(B0)

$$\frac{2-x}{\sqrt{1+3x}} = (2-x)\left(1 + \frac{3}{2}x - \frac{9}{8}x^2 + \dots\right)$$

$$= 2 + 3x - \frac{9}{4}x^2 - x - \frac{3}{2}x^2 + \dots$$

$$= 2 + 2x - \frac{15}{4}x^2 + \dots$$

(B3) B1 each term

Ignore further terms, ISW

Expansion valid for $|3x| < 1$

$$|x| < \frac{1}{3} \text{ or } -\frac{1}{3} < x < \frac{1}{3}$$

(B1) B1 for $x < \frac{1}{3}$ and $x > -\frac{1}{3}$

B0 anything else

Correct substitution

(M1)

(A0)

Q	Solution	Mark	Notes
9(a)	$u_1 = \sin\left(\frac{\pi}{2}\right) = 1$ $u_2 = \sin\left(\frac{2\pi}{2}\right) = 0$ $u_3 = \sin\left(\frac{3\pi}{2}\right) = -1$ $u_4 = \sin\left(\frac{4\pi}{2}\right) = 0$ $u_5 = \sin\left(\frac{5\pi}{2}\right) = \sin\left(\frac{\pi}{2}\right) = 1$ Sequence is periodic (with period 4)	B1	All 5 terms Condone 'Repeats every 4 terms' or 'Oscillates'
9(b)	$u_5 = 17$ $(u_5 = 17), u_4 = 9, u_3 = 5, u_2 = 3, u_1 = 2$ Sequence is increasing.	B1 B1 B1	 Accept 'Divergent'

Q	Solution	Mark	Notes
10	$\frac{6x^5-17x^4-5x^3+6x^2}{(3x+2)} = \frac{(x^2)(6x^3-17x^2-5x+6)}{(3x+2)}$	M1	or removing x^2 from pentic
	$= \frac{(x^2)(3x+2)(2x^2-7x+3)}{(3x+2)}$	M1	divide by $(3x+2)$, or realising $(3x+2)$ is a factor of the cubic and cancelling
	$= x^2(2x-1)(x-3) = 0$	A1	Sight of $(2x^2-7x+3)$
	$x = 0(\text{twice}), \frac{1}{2}, 3.$	A1	Must be seen cao A0 if $-\frac{2}{3}$ present

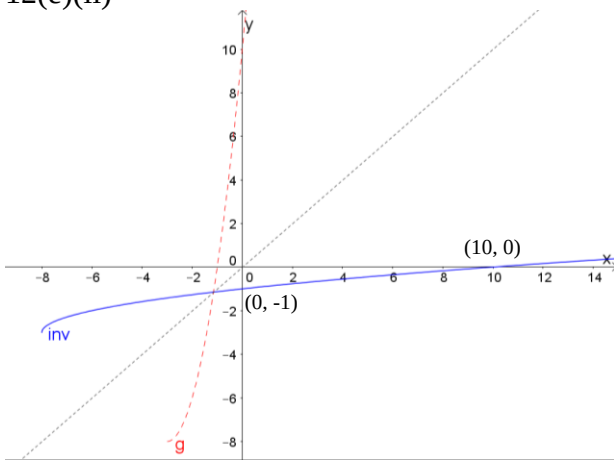
Note: $(6x^3-17x^2-5x+6) = (x-3)(6x^2+x-2)$
 $(6x^3-17x^2-5x+6) = (2x-1)(3x^2-7x-6)$

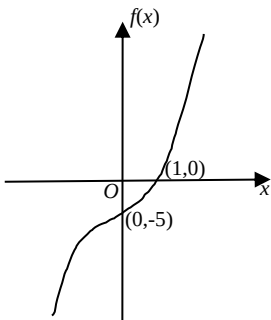
Alternative Solution

10	$\frac{6x^5-17x^4-5x^3+6x^2}{(3x+2)} = \frac{(x^2)(6x^3-17x^2-5x+6)}{(3x+2)}$	(M1)	or removing x^2 from pentic
	$= \frac{(x^2)(3x+2)(2x^2-7x+3)}{(3x+2)}$	(M1)	any linear factor or divide by $(3x+2)$
	$= x^2(2x-1)(x-3) = 0$	(A1)	Sight of $(2x^2-7x+3)$ oe or second factor from factor theorem
	$x = 0(\text{twice}), \frac{1}{2}, 3.$	(A1)	$(3x+2)$ must be cancelled or solution discarded cao A0 if $-\frac{2}{3}$ present

Note: $(6x^3-17x^2-5x+6) = (x-3)(6x^2+x-2)$
 $(6x^3-17x^2-5x+6) = (2x-1)(3x^2-7x-6)$

Q	Solution	Mark	Notes
11(a)	$9\cos x + 40\sin x = R\cos x\cos\alpha + R\sin x\sin\alpha$ $R\cos\alpha = 9$ and $R\sin\alpha = 40$ $R = \sqrt{9^2 + 40^2} = 41$ $\alpha = \tan^{-1}\left(\frac{40}{9}\right) = 77.32^\circ$ $9\cos x + 40\sin x \equiv 41\cos(x - 77.32^\circ)$	M1 B1 A1	implied by correct α if nothing seen. M0 for incorrect equations accept 1.349 rad, not 1.349 ft R if $\alpha = \sin^{-1}\left(\frac{40}{R}\right) = \cos^{-1}\left(\frac{9}{R}\right)$
11(b)	$y = \frac{12}{9\cos x + 40\sin x + 47}$ Maximum y when denominator is minimum, i.e. when $\cos(x - 77.32^\circ) = -1$ Max $y \left(= \frac{12}{-41+47} \right) = 2$	M1 A1	implied by correct max ft R

Q	Solution	Mark	Notes
12(a)	$ff(p) = f(0) = 10$	B1	
12(b)	$2x^2 + 12x + 10 = 0$ $2(x^2 + 6x + 5) = 0$ $2(x + 5)(x + 1) = 0$ $p = -5, q = -1$	M1 A1	may be implied by solution both
12(c)	$f(x) = 2[x^2 + 6x + 5]$ $= 2[(x + 3)^2 - 4]$ $= 2(x + 3)^2 - 8$ Min point at $(-3, -8)$	M1 A1 B1	condone absence of '2' cao
12(d)	$f(x)$ is not a one-to-one function (on its domain).	B1	
12(e)(i)	Let $y = 2(x + 3)^2 - 8$ $(x + 3)^2 = \frac{y+8}{2}$ $x = -3 \pm \sqrt{\frac{y+8}{2}}$ since $x \geq -3, x = -3 + \sqrt{\frac{y+8}{2}}$ $g^{-1}(x) = -3 + \sqrt{\frac{x+8}{2}}$	M1 A1 A1 A1	ft similar form from (c) Condone $x = -3 + \sqrt{\frac{y+8}{2}}$ Must discard negative root interchange x and y , could be done earlier
12(e)(ii)		B1 B1	Correct shape (10, 0) (0, -1), cao

Q	Solution	Mark	Notes
13(a)	$f'(x) = 6x^2 + 3$ Hence $f'(x) > 0$ for all x , i.e. $f(x)$ does not have a stationary point.	B1 E1	oe e.g. $f'(x) = 0$ has no real roots discriminant $= 0^2 - 4(6)(3) < 0$, no real roots
13(b)	$f''(x) = 12x$ At point of inflection $f''(x) = 0, x = 0$ $f'(x) > 0$ when $x < 0$ and when $x > 0$. Therefore, when $x = 0$, there is a point of inflection.	M1 m1 A1	oe cubic curve no max/min must have a point of inflection. OR $x > 0, f''(x) > 0; x < 0, f''(x) < 0$
	The point of inflection is $(0, -5)$	B1	
13(c)		G1	cubic curve no max/min ft point in (b) coords not required. $(1,0)$ not required.

Q	Solution	Mark	Notes
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14	$I = [\pm \cos x \cdot x^2]_0^\pi - \int_0^\pi \pm \cos x \cdot 2x \, dx$	M1	attempt at parts, 2 terms, at least one term correct. Limits not required
	$I = [-\cos x \cdot x^2]_0^\pi - \int_0^\pi -\cos x \cdot 2x \, dx$	A1	
	$I = [-\cos x \cdot x^2]_0^\pi + [\sin x \cdot 2x]_0^\pi$ $- \int_0^\pi 2\sin x \, dx$	A1	correct integration of $\int_0^\pi \pm \cos x \cdot 2x \, dx$
	$I = [-\cos x \cdot x^2]_0^\pi + [2\sin x \cdot x]_0^\pi + [2\cos x]_0^\pi$	A1	correct integration of $\int_0^\pi \pm \sin x \, dx$
	$I = [2x\sin x + (2 - x^2)\cos x]_0^\pi$		
	$I = \pi^2 + 0 + 2(-1 - 1)$	m1	correct use of correct limits Implied by correct answer
	$I = \pi^2 - 4 (= 5.87)$	A1	cao

Note

No marks for answer unsupported by workings.

If integration is incorrect and answer of 5.87 seen with **no working**, m0 A0. If substitution seen m1 is available.

Be careful of use of calculators to obtain correct answer after incorrect integration.

Condone missing dx .

M1A0 only for $I = \left[\sin x \cdot \frac{x^3}{3} \right]_0^\pi - \int_0^\pi \frac{x^3}{3} \cos x \, dx$

Q	Solution	Mark	Notes
15(a)	$y = \sqrt{16 - x^2}$ OR $A = 2xy$	B1	
	$A = 2x\sqrt{16 - x^2}$	B1	
15(b)	$\frac{dA}{dx} = \frac{d}{dx}[2x(16 - x^2)^{1/2}]$	M1	$f(x)(16 - x^2)^{1/2} + 2xg(x)$
		M0	if $f(x) = 0$ or 1 or $g(x) = 0$ or 1
			Only ft if product with $Bx\sqrt{K - x^2}$
	$\frac{dA}{dx} = 2(16 - x^2)^{1/2} + 2x \times \frac{1}{2}(16 - x^2)^{-1/2}(-2x)$	A1A1	one each term, ft (a)
	$\frac{dA}{dx} = \frac{4}{(16 - x^2)^{1/2}}[8 - x^2]$		
	At max, $\frac{dA}{dx} = 0$	m1	
	$x^2 = 8$	A1	cao
	$x = 2\sqrt{2}$ (-ve value inadmissible)		
	$y = \sqrt{16 - x^2} = \sqrt{16 - 8} = 2\sqrt{2}$	A1	cao accept $y^2 = 8$
	therefore $y = x$.		
	Justification of maximum	B1	$\frac{d^2A}{dx^2} = -22$ when $x = 2\sqrt{2}$
	OR		
	$A^2 = 4x^2(16 - x^2) = 64x^2 - 4x^4$		
	$\frac{dA^2}{dx} = 128x - 16x^3$	(M1A1A1)	
	At max, $\frac{dA^2}{dx} = 0$	(m1)	
	$x^2 = 8, x = 2\sqrt{2}$ (-ve value inadmissible)	(A1)	cao
	$y = \sqrt{16 - x^2} = \sqrt{16 - 8} = 2\sqrt{2}$	(A1)	cao accept $y^2 = 8$
	therefore $y = x$.		
	Justification of maximum	(B1)	$\frac{d^2A^2}{dx^2} = -256$ when $x = 2\sqrt{2}$

Q	Solution	Mark	Notes
16(a)	Where C meets the y -axis,		
	$3 - 4t + t^2 = 0$	M1	
	$(t - 1)(t - 3) = 0$		
	$t = 1$, point is $(0, 9)$	A1	or $t = 1, 3$
	$t = 3$, point is $(0, 1)$	A1	all correct

16(b)	$\frac{dy}{dt} = -2(4 - t)$	B1	
	$\frac{dx}{dt} = -4 + 2t$	B1	
	$\frac{dy}{dx} = \frac{-2(4-t)}{-4+2t}$	B1	ft their dy/dt and dx/dt

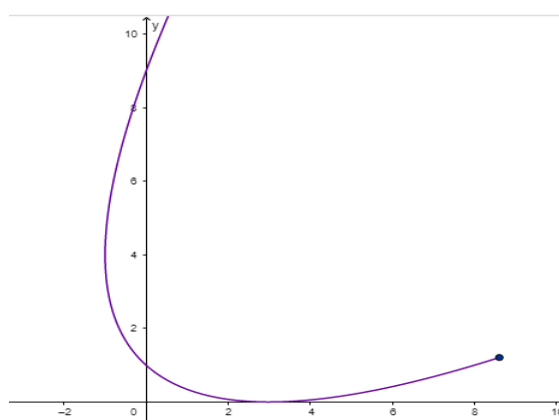
Note: May be seen in (a)

At stationary point, $\frac{-2(4-t)}{-4+2t} = 0$ M1

$$t = 4$$

At stationary point, $y = (4 - 4)^2 = 0$.

Hence the x -axis is a tangent to the curve C . A1



Q	Solution	Mark	Notes
17(a)	$\cos(\alpha - \beta) + \sin(\alpha + \beta)$ $= \cos\alpha\cos\beta + \sin\alpha\sin\beta + \sin\alpha\cos\beta + \cos\alpha\sin\beta$ $= \cos\alpha(\cos\beta + \sin\beta) + \sin\alpha(\cos\beta + \sin\beta)$ $= (\cos\alpha + \sin\alpha)(\cos\beta + \sin\beta)$	B1	expand $\cos(\alpha - \beta)$, $\sin(\alpha + \beta)$ convincing

OR

$$\begin{aligned}
 & (\cos\alpha + \sin\alpha)(\cos\beta + \sin\beta) \\
 &= \cos\alpha\cos\beta + \cos\alpha\sin\beta + \sin\alpha\cos\beta + \sin\alpha\sin\beta \quad (\text{B1}) \quad \text{remove brackets} \\
 &= \cos\alpha\cos\beta + \sin\alpha\sin\beta + \sin\alpha\cos\beta + \cos\alpha\sin\beta \\
 &= \cos(\alpha - \beta) + \sin(\alpha + \beta) \quad (\text{B1}) \quad \text{convincing}
 \end{aligned}$$

OR

$$\begin{aligned}
 & \cos(\alpha - \beta) + \sin(\alpha + \beta) \\
 &= \cos\alpha\cos\beta + \sin\alpha\sin\beta + \sin\alpha\cos\beta + \cos\alpha\sin\beta \quad (\text{B1}) \quad \text{expand } \cos(\alpha - \beta), \sin(\alpha + \beta) \\
 & (\cos\alpha + \sin\alpha)(\cos\beta + \sin\beta) \\
 &= \cos\alpha\cos\beta + \cos\alpha\sin\beta + \sin\alpha\cos\beta + \sin\alpha\sin\beta \quad (\text{B1}) \quad \text{remove brackets} \\
 & \text{Hence } \cos(\alpha - \beta) + \sin(\alpha + \beta) \\
 & \quad = (\cos\alpha + \sin\alpha)(\cos\beta + \sin\beta)
 \end{aligned}$$

Q	Solution	Mark	Notes
17(b)(i)	Put $\alpha = 4\theta$, $\beta = \theta$	M1	
	$\cos(4\theta - \theta) + \sin(4\theta + \theta)$ $= (\cos 4\theta + \sin 4\theta)(\cos \theta + \sin \theta)$ $\frac{\cos 3\theta + \sin 5\theta}{\cos 4\theta + \sin 4\theta} = \cos \theta + \sin \theta$	A1	convincing
17(b)(ii)	When $\theta = \frac{3\pi}{16}$,		
	$\cos 4\theta + \sin 4\theta = \cos \frac{3\pi}{4} + \sin \frac{3\pi}{4} = 0$		
	So $\frac{\cos 3\theta + \sin 5\theta}{\cos 4\theta + \sin 4\theta}$ is undefined.	B1	oe
	OR		
	$\cos 4\theta + \sin 4\theta \neq 0$		
	$\tan 4\theta \neq -1$		
	$4\theta \neq \frac{3\pi}{4}$		
	$\theta \neq \frac{3\pi}{16}$	B1	

Q	Solution	Mark	Notes
18(a)	Put $u = x + 3$	B1	
	$\int \frac{x^2}{(x+3)^4} dx = \int \frac{(u-3)^2}{u^4} du$	M1	Allow one slip
	$= \int \frac{u^2 - 6u + 9}{u^4} du$		
	$= \int (u^{-2} - 6u^{-3} + 9u^{-4}) du$	A1	integrable form ft $(u + 3)$ only
	$= \frac{u^{-1}}{-1} - \frac{6u^{-2}}{-2} + \frac{9u^{-3}}{-3} (+C)$	A1	correct integration ft $(u + 3)$ only
	$= -\frac{1}{u} + \frac{3}{u^2} - \frac{3}{u^3} (+C)$		
	$= -\frac{1}{x+3} + \frac{3}{(x+3)^2} - \frac{3}{(x+3)^3} + C$	A1	cao Correct expression in terms of x Must include $+ C$
18(b)	$\int_0^1 \frac{x^2}{(x+3)^4} dx = \left[-\frac{1}{x+3} + \frac{3}{(x+3)^2} - \frac{3}{(x+3)^3} \right]_0^1$		
	$= \left(-\frac{1}{4} + \frac{3}{16} - \frac{3}{64} \right) - \left(-\frac{1}{3} + \frac{1}{3} - \frac{1}{9} \right)$	M1	correct use of correct limits ft for equivalent difficulty for M1 only
	$= \frac{1}{576} (= 0.001736)$	A1	cao No workings, 0 marks
OR			
	$\int_0^1 \frac{x^2}{(x+3)^4} dx = \left[-\frac{1}{u} + \frac{3}{u^2} - \frac{3}{u^3} \right]_3^4$		
	$= \left(-\frac{1}{4} + \frac{3}{16} - \frac{3}{64} \right) - \left(-\frac{1}{3} + \frac{1}{3} - \frac{1}{9} \right)$	(M1)	correct use of correct limits ft for equivalent difficulty for M1 only
	$= \frac{1}{576} (= 0.001736)$	(A1)	cao No workings, 0 marks