IB	Mathematics:	Analysis	& Approache	s HL
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- **Part 1** NO calculator allowed Questions 1-7
- **1.** Find all **exact** solutions to the equation $2\sin^2 x + 3\cos x = 0$ in the interval $0 \le x \le 2\pi$. [6 marks]
- 2. The diagram shows a circle with centre O and radius OA = 2 cm. The central angle AOB has a measure of $\frac{5\pi}{6}$ radians. Find the **exact** area of the shaded region. [4 marks]
- **3.** Write down the domain, range, period and amplitude for each function.

	(a) $y = 3\cos\left(2x + \frac{\pi}{2}\right)$		[5 marks]	
	domain:	range:		
	period:	amplitude:		
	(b) $y = 2 - \sin\left(\frac{x}{4}\right)$		[5 marks]	
	domain:	range:		
	period:	amplitude:		
4.	Write down the domain, range and	period of the function $g(x) = \tan\left(\frac{x}{3}\right)$.	[5 marks]	
	domain:	range: I	period:	
5.	The curve shown below has an equ	nation in the form $y = a \sin[b(x+c)] + d$, w	where a , b and c	
are integers. The curve passes through the point $\left(\frac{\pi}{4}, 1\right)$ Write down the values of <i>a</i> ,				
	<i>a</i> =		\frown	
	<i>b</i> =			
	<i>c</i> =	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\frac{7\pi}{4} 2\pi \frac{9\pi}{4} x$	
	<i>d</i> =	-2-		
	[8 marks]	-3		
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Total marks on test: 70

IB Mathematics: Analysis & Approaches HL



Test HL - **Trigonometric Functions and Equations**

6. Find all exact solutions to the equation $\sin^2 x = \frac{3}{4}$ in the interval $0 \le \theta < 360^\circ$. [5 marks]

7.	If $\cos\beta = -\frac{2}{5}$ and	d $0 \le \beta \le \pi$, find the exact values of the following	[8 marks]
	(a) $\sin\beta$	(b) $\tan \beta$	(c) $\csc 2\beta$

--- end of part 1 ---

- **Part 2** Calculator allowed Questions 8-11
- 8. Find all of the values of θ in the interval $0 \le \theta \le \pi$ which satisfy the equation $\cos 2\theta = \sin^2 \theta$. [5 marks]
- 9. In the diagram below, triangle ABD and triangle DBC are right triangles, $ABC = \alpha + \beta$, DC = 3, BC = 4 and AD = 12.
 - (a) Show that the exact value of $\cos ABC = -\frac{16}{65}$. [4 marks]
 - (b) Add the line segment AC to the diagram. Find the length of AC accurate to three significant figures. [3 marks]

10. Given that $\tan 2x = \frac{4}{3}$, find all possible values of $\tan x$. Express any answers exactly. [5 marks]

- 11. The triangle ABC, as shown in the diagram, has AC = 8 cm, CB = 12 cm and $ACB = \theta$ radians. The area of triangle $ABC = 20 \text{ cm}^2$.
 - (a) Show that $\theta = 0.430$, correct to three significant figures. [3 marks]
 - (b) The point D lies on CB such that AD is an arc of a circle with centre C and radius 8 cm. The region bounded by the arc AD and the line segments DB and AB is shaded in the diagram.

θ

Calculate, to three significant figures:

- (i) the length of the arc AD; [2 marks]
- (ii) the area of the shaded region. [2 marks]

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