MEMORANDUM

Name: ..... Class: .....

Date: .....

MARK ____ / 20

Answer all questions. Show all your working — marks are awarded for method as well as the final answer. **Teacher copy: accept any correct equivalent method.**

1 Write down the amplitude of $y = 2\sin x$. **(1)**

2 ✓ (1)

2 Write down the period of $y = \sin 2x$. **(1)**

$\frac{360°}{2} = 180°$ ✓ (1)

3 Write down the range of $y = 2\sin x$. **(2)**

$-2 \leq y \leq 2$ ✓✓ (2)

4 Describe the transformation from $y = \cos x$ to $y = \cos(x + 60°)$. **(2)**

A shift of **60° to the left** ✓✓ (2)

5 Write down the period of $y = \tan 2x$. **(1)**

$\frac{180°}{2} = 90°$ ✓ (1)

6 Write down the equations of the asymptotes of $y = \tan x$ for $x \in [0° ; 360°]$. **(2)**

$x = 90°$ and $x = 270°$ ✓✓ (2)

7 How many complete cycles does $y = \sin 2x$ complete in $[0° ; 360°]$? **(1)**

2 ✓ (1)

8 Write down the range of $y = \tan x$. **(1)**

$y \in \mathbb{R}$ ✓ (1)

9 For $y = 4\sin 3x$, write down the amplitude and the period, and state how many complete waves appear in $[0° ; 360°]$. **(3)**

> Amplitude 4 ✓; period $= 360° \div 3 = 120°$ ✓; three complete waves ✓ **(3)**

10 Describe fully the transformation from $y = \cos x$ to $y = -2\cos(x + 45°)$. **(3)**

> Amplitude becomes 2 ✓; the graph is reflected in the x-axis because a is negative ✓; and it shifts $45°$ to the LEFT ✓ **(3)**

11 The graph of $y = a\sin kx$, where $a > 0$ and $k > 0$, has amplitude 5 and period $90°$. Determine a and k, and write down the equation. **(3)**

> $a = 5$ ✓; $360° \div k = 90°$ so $k = 4$ ✓; $y = 5\sin 4x$ ✓ **(3)**

TOTAL: 20 marks

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