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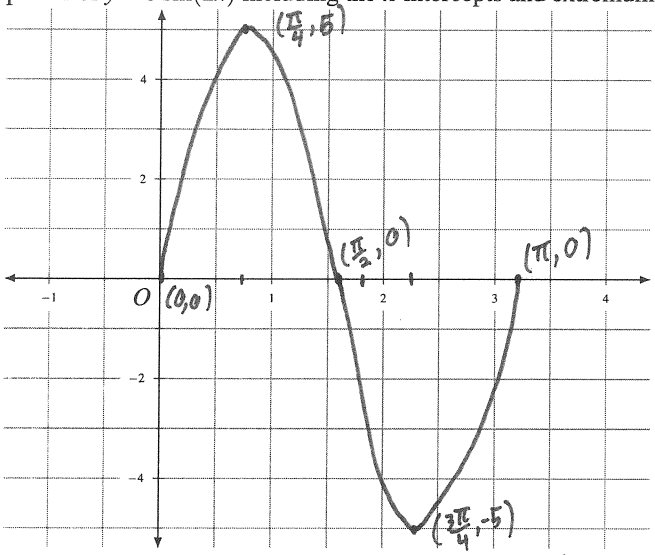
Quiz 14

This quiz is graded out of 20 marks. No books, watches, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. *(4 marks)* Find the amplitude and period and sketch one period of $y = 5\sin(2x)$ including the x-intercepts and extremum points.

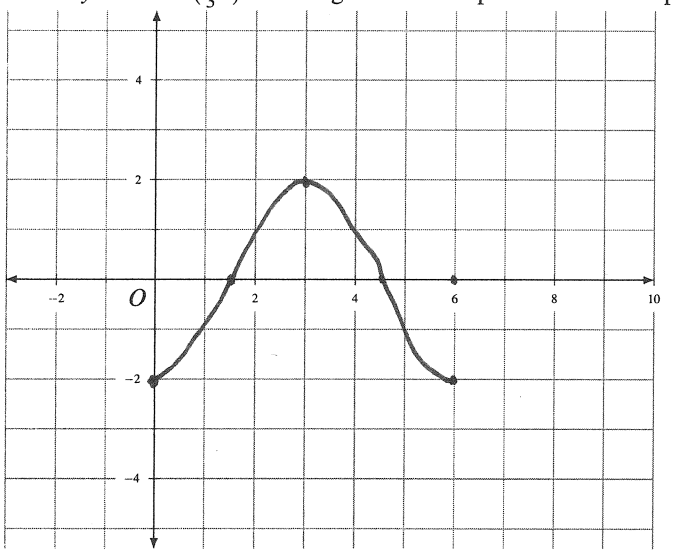


amplitude = 5

period = $\frac{2\pi}{b} = \frac{2\pi}{2} = \pi$

x	$y = 5\sin(2x)$
0	0
$\frac{\pi}{4}$	5
$\frac{\pi}{2}$	0
$\frac{3\pi}{4}$	-5
π	0

Question 2. *(4 marks)* Find the amplitude and period and sketch one period of $y = -2\cos(\frac{\pi}{3}x)$ including the x-intercepts and extremum points.



amplitude = 2

period = $\frac{2\pi}{\frac{\pi}{3}} = 6$

x	$y = -2\cos(\frac{\pi}{3}x)$
0	-2
3/2	0
3	2
9/2	0
6	-2

Question 3. *(3 marks)* Verify the following identity: $\cos x \tan x \csc x = 1$

$LHS = \cos x \tan x \csc x$

$= \cos x \frac{\sin x}{\cos x} \frac{1}{\sin x}$

$= 1 = RHS$

Question 4. *(3 marks)* Verify the following identity: $\sin^2 x(1+\cot^2 x) + \cos^2 x(1+\tan^2 x) = 2$

$LHS = \sin^2 x + \sin^2 x \frac{\cos^2 x}{\sin^2 x} + \cos^2 x \frac{\sin^2 x}{\cos^2 x} + \cos^2 x$

$= 2(\sin^2 x + \cos^2 x)$

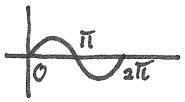
$= 2(1)$

$= 2 = RHS$

Question 5. *(6 marks)* Solve for x, giving exact solutions where possible, $0 \le x < 2\pi$: $\sin x - \sqrt{2}\sin^2 x = 0$

$\sin x(1 - \sqrt{2}\sin x) = 0$

$\sin x = 0$

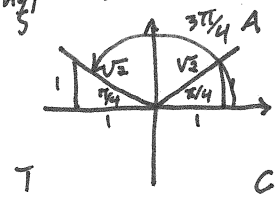


$x = 0, \pi$

$1 - \sqrt{2}\sin x = 0$

$1 = \sqrt{2}\sin x$

$\frac{opp}{hyp} = \frac{1}{\sqrt{2}} = \sin x$



$x = \frac{\pi}{4}, \frac{3\pi}{4}$

$\therefore x = 0, \frac{\pi}{4}, \pi, \frac{3\pi}{4}$