FOUNDATION PROGRAM | MATH UNIT

FP— MATH LEVEL 2 (PURE) - FPM 102B

MATH MODEL PAPER - FINAL EXAM - TERM (2023-24)

Student Name										
Student ID									**Date:**	
Section									**Duration: 1 hour 45 minutes**	
Instructor	Mohammad Mustafa, Waqar Khan, Tareq Al Khushban									

Instructions:

1) The exam has 5 main questions with a scratch sheet at the end.
2) Please turn off your mobile phone.
3) Use only a blue or black pen.
4) No talking, passing objects or looking in the direction of another student's paper. Any of these behaviors will be considered cheating.

Marking Grid

Question	Question 1 MCQ's (out of 10)	Question 2 (out of 11)	Question 3 (out of 6)	Question 4 (out of 8)	Question 5 (out of 5)	Total / 40 marks
Marks obtained						

Marker's name:		Moderator's name:		
Marker's signature:		Moderator's signature:		
Date:		Date:		

Question 1: MULTIPLE CHOICE.   **(10 Marks)**

1)	Which set of data has a median of 5? a. 3, 10, 5, 12, 20 b. 5, 20, 16, 17, 10 c. 5, 2, 9, 10, 3 d. 4, 10, 1, 2, 5
2)	Participant 1,2,3,4,5 start a race. In how many different orders can they finish the race? a. 120 b. 60 c. 1 d. None
3)	When three coins are tossed, the number of possible outcomes is: a. 4 b. 8 c. 36 d. 2
4)	When one die is rolled., the probability of "having odd number " occurs: a. $\frac{1}{2}$ b. $\frac{1}{6}$ c. $\frac{1}{3}$ d. $\frac{3}{4}$
5)	The coordinates of the point P for the angle $t = \frac{\pi}{2}$ in unit circle are: (a) $(1,0)$ (b) $(0,1)$ (c) $(-1,0)$ (d) $(0,-1)$
6)	The amplitude of the function $f(x) = 4\sin 5x$. (a) $\frac{1}{2}$ (b) -4 (c) 5 (d) 4
7)	The Period of the function $f(x) = 3\sin\frac{1}{3}x$. (a) $\frac{\pi}{3}$ (b) 6π (c) 3π (d) π
8)	$\sin\left(-\frac{\pi}{2}\right) =$ (a) 1 (b) -1 (c) 0 (d) $\frac{1}{2}$
9)	$\cos(-x) =$ (a) $\cos x$ (b) $sin^2 x$ (c) $-\cos x$ (d) $1 - sin^2 x$
10)	If $\tan x = \sqrt{3}$, then $\cot x =$ (a) -1 (b) 1 (c) $\frac{1}{\sqrt{3}}$ (d) $\sqrt{3}$

Question 2:   Prove the following two identities: **(11 Marks)**

1) $\dfrac{1}{1-\cos x} + \dfrac{1}{1+\cos x} = 2\,csc^2x$ (6 Marks)

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2) $sin^4x - cos^4x = 2\,sin^2x - 1$ (5 Marks)

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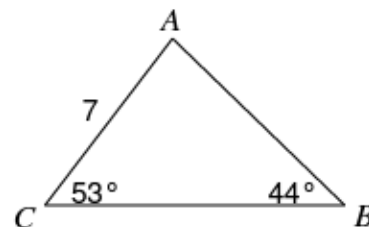**Question 3:** in the following graph of triangle find: **(6 Marks)**

(Use the law of sine, round to nearest hundredth)

1) $CB =$ (3 Marks)

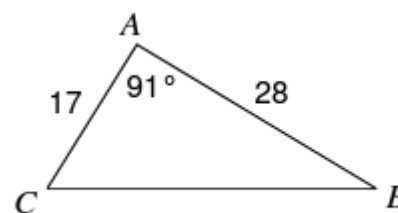2) $AB =$ (3 Marks)

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Question 4: in the following graph of triangle find: **(8 Marks)**

(Use the law of cosine, round to nearest hundredth)

1) $CB =$ (4 Marks)

2) (The angle C) =   (4 Marks)

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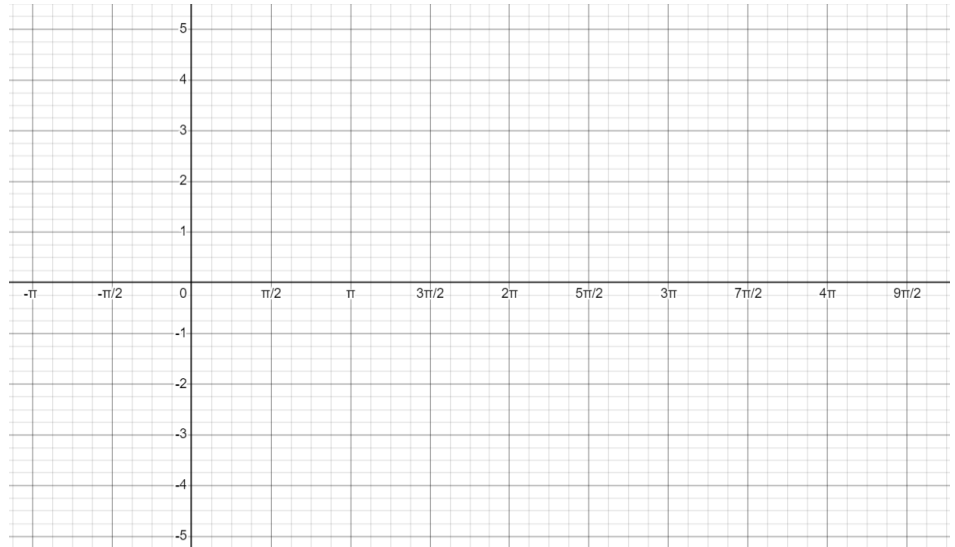## Question 5:   **(5 Marks)**

If $f(x) = 3\sin(-2x)$, then:

1) Sketch the graph of this function.   (4 Marks)

2) Find the range of this function =   (1 Mark)

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End of Model paper - Final Exam

SCRATCH SHEET

Name: _____

Note:

1. This scratch sheet will not be marked.
2. Do not detach it from the rest of exam papers.