

LOCATION: SWANSEA

LLEOLIAD: ABERTAWE

LEVEL 4

LEVEL 4

EXAMINATION PERIOD
MARCH 2022

MODULE CODE: ACHA4006
FURTHER MATHEMATICS MOCK

TIME: 1 ½ HOURS

(PLUS HALF AN HOUR TO SUBMIT SOLUTIONS – 2 HOURS IN TOTAL)

ANSWER ALL QUESTIONS

Equipment or materials required –

Calculators allowed

Formula booklet provided

SHOW ALL WORKINGS

IMPORTANT INSTRUCTIONS FOR ONLINE EXAMINATIONS:

- ***You will need to submit a digital photograph or scan of each page of workings***
- ***Please submit these to Moodle (underneath where you accessed the exam paper)***
- ***Put the time, date, module code and your student number at the top of each page***
- ***Number each page ‘x of y’***
- ***If you have any issues, email richard.sutton@uwtsd.ac.uk with a contact number and they will call you with advice***

QUESTION ONE

Differentiate the following functions:

(i) $y = x^3 - 4x^2 + 2x + 3$

(ii) $y = (x + 1)(x + 5)$

(iii) $y = \frac{1}{x^2} + \sin 2x$

(iv) $y = x^7 \sin 3x$

(v) $y = \frac{e^x}{\cos 5x}$

(vi) $y = (x^3 + 4x + 1)^4$

(20 marks)

QUESTION TWO

Solve the following trigonometric equations for $0^\circ \leq x \leq 360^\circ$:

(i) $\sin x = 0.27$

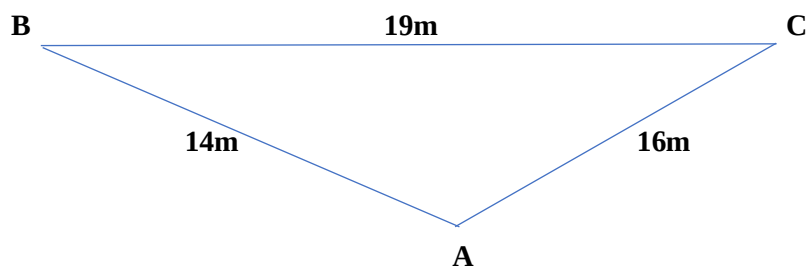
(ii) $6 \cos x = 5$

(iii) $\tan x = 1.23$

(9 marks)

QUESTION THREE

Find the angle at A in the following triangle:



(5 marks)

QUESTION FOUR

Transpose the following formula to get x as the subject:

$$Q = \frac{\sqrt{x} + Z}{T}$$

(4 marks)

QUESTION FIVE

Solve the following equations for x :

- (i) $6^{x+1} = 4^x$
- (ii) $\log(x + 5) + \log(x + 1) = 2 \log(x + 6)$

(10 marks)

QUESTION SIX

Integrate the following:

- (i) $\int x^5 + x^2 + 4x + 15 \, dx$
- (ii) $\int (x + 3)(x + 6) \, dx$
- (iii) $\int 2 \cos 3x \, dx$
- (iv) $\int_0^2 (x + 1)(x + 2) \, dx$
- (v) $\int_2^4 x^2(x + 5) \, dx$

(25 marks)

TOTAL MARKS: 73