

LOCATION: SWANSEA

LLEOLIAD: ABERTAWE

LEVEL 3

LEFEL 3

MODULE CODE: ACHA3000
INTRODUCTION TO MATHEMATICS AND SCIENCE (TEST 1)

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***

1. Simplify the following:

(i) $x^4 \times x^6 \times x$

(ii) $2x^2 \times 3x^3 \times 2x$

(iii) $\frac{x^4 \times x^3 \times x^2}{x^9}$

(iv) $(3x^2)^3$

(v) $\sqrt{x} \times \sqrt{x}$

(7 marks)

2. Solve the following linear equations for x :

(i) $15x - 2 = 12x + 9$

(ii) $3(7x - 1) = 6(x + 3)$

(iii) $\frac{5x+3}{4} = \frac{2x-1}{9}$

(12 marks)

3. Solve the following quadratic equations by using the factorisation method:

(i) $x^2 + 10x + 21 = 0$

(ii) $x^2 - 3x + 2 = 0$

(iii) $x^2 + 12x + 20 = 0$

(iv) $x^2 - 64 = 0$

(v) $2x^2 + 9x + 10 = 0$

(16 marks)

4. Use the formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ to find the two solutions of the following quadratic equation, **giving your answers correct to two decimal places.**

$$14x^2 + 3x = 11$$

(7 marks)

5. Solve the following simultaneous equations:

$$5x + 3y = 39$$

$$8x - 2y = 42$$

(5 marks)

6. Simplify the following as far as possible:

$$5(2x^2 - y^2) - x^2(x^2 - y) - x^2y - x^4$$

(4 marks)

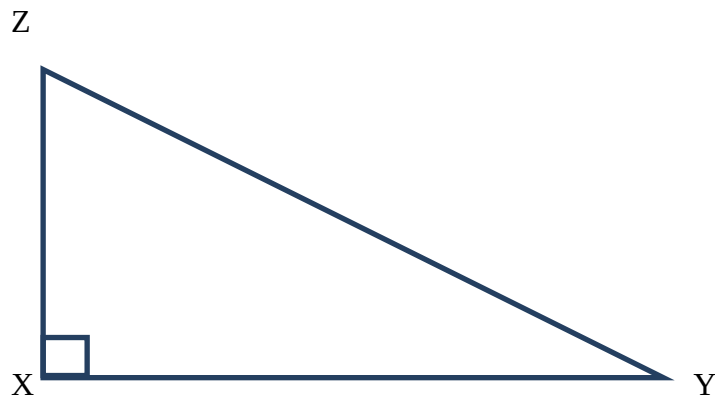
7.

In the following right-angled triangle, if XZ is 4 metres and XY is 7 metres, calculate:

(i) Angle Y

(ii) Angle Z

(iii) Length YZ using Pythagoras' theorem



(6 marks)

8. Express the following as x to a power:

(i) $\sqrt[3]{x}$

(ii) 1

(2 marks)

TOTAL MARKS: 59