

LOCATION: SWANSEA

LLEOLIAD: ABERTAWE

LEVEL 4

LEFEL 4

EXAMINATION PERIOD
SEM2 2020

CYFNOD ARHOLIADAU
SEM 2 2020

MODULE CODE: ACDA4003
RESIT: MATHS FOR SOFTWARE DEVELOPMENT

TIME: 1 HOUR AND 30 MINUTES

ANSWER ALL QUESTIONS

When answering each question, you must lay out numerical solutions clearly, spacing out each stage and showing your workings.

Equipment or materials required –Approved Calculators; Formula Sheet;

You can use your personal notes, texts and online module resources we have used in class to answer questions.

Adnoddau neu ddefnyddiau sydd eu hangen -Approved Calculators; Formula Sheet

ANSWER ALL QUESTIONS

Note: In the following questions vectors are written as (x,y,z) triples where x,y and z are the length of the three orthogonal unit vectors i, j and k respectively.

When answering each question, you must lay out numerical solutions clearly, spacing out each stage and showing your workings.

1) Solve the following linear equations for .

i) $6 + 3(x + 1) = 5x + 4$

[6 Marks]

ii) $\frac{10x - 22}{6} = \frac{20 - 3x}{2}$

[6 Marks]

2) Given $A = \begin{bmatrix} 1 & 1 & 3 \\ 2 & 3 & -1 \\ 1 & 2 & -3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 & -1 \\ 3 & -3 & 1 \\ 1 & -1 & 3 \end{bmatrix}$ find:

i) $A-B$

[4 Marks]

ii) AB

[6 Marks]

iii) $A+B$

[4 Marks]

iv) B^T

[4 Marks]

3) Given $A = \begin{bmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \\ 1 & 3 & 2 \end{bmatrix}$, find the determinant of A .

[8 Marks]

4) Using any method, find x, y and z in the following set of simultaneous equations.

$$1x + 2y + 1z = 4$$

$$2x - 1y + 1z = 8$$

$$1x + 3y + 2z = 8$$

Hint: the inverse of the matrix in question 3 is $\frac{-1}{4} \begin{bmatrix} -5 & -1 & 3 \\ -3 & 1 & 1 \\ 7 & -1 & -5 \end{bmatrix}$

[16 Marks]

5) Re-arrange the following equations to make s the subject:-

a) $v^2 = u^2 - 5rs^2$

[4 Marks]

b) $\frac{1}{r} = \frac{4}{s} - \frac{2}{w}$

[4 Marks]

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- 6) Find the cross product ($\mathbf{a} \times \mathbf{b}$) of the two vectors $\mathbf{a}=(1,-1,5)$ and $\mathbf{b}=(2,2,-1)$.
[10 Marks]
- 7) Find the dot product of the two vectors $(1,-1,5)$ and $(2,2,-1)$ and hence calculate the angle between the two vectors.
[12 Marks]
- 8) Does the point $\underline{\mathbf{x}} = (1,2,1)$ lie on the plane given by $\underline{\mathbf{a}} \cdot \underline{\mathbf{x}} + d = 0$, where $d = -8$ and $\underline{\mathbf{a}} = (-2,-2,-3)$? Explain your reasoning.
[6 Marks]

Diwedd/End