

25 May, 2011
Math 1107, Section A

TEST 1

1. Give the complex conjugate of $z = -2 - 3i$ [2 marks].

2. Evaluate $|-2 - 3i|$ [2 marks].

3. Simplify the following into the form $a + bi$ [6 marks]:

$$\frac{3 - 2i}{2 + i} - \frac{1 + i}{1 - i}$$

4. Consider the polynomial $x^2 + 4x + 5 = 0$. Solve for x [3 marks].

5. Consider the following 3 vectors:

$$\vec{u} = \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix}, \vec{v} = \begin{pmatrix} 1 \\ 1 \\ 2 \end{pmatrix}, \vec{w} = \begin{pmatrix} -2 \\ 0 \\ 1 \end{pmatrix}$$

- (a) Find the angle between \vec{u} and \vec{v} . Give your answer in **degrees** OR **radians** [4 marks].
- (b) Find the angle between \vec{v} and \vec{w} . Give your answer in **degrees** OR **radians** [4 marks].
- (c) What other property gives the angle between \vec{v} and \vec{w} [2 marks]?
- (d) Evaluate $\vec{u} - \vec{v}$ [2 marks].
- (e) Evaluate $|3\vec{u} + 2\vec{v} + \vec{w}|$ [6 marks].
- (f) Find the projection of \vec{u} on to \vec{v} [5 marks].
- (g) Normalize \vec{w} [2 marks].
- (h) Find the unit vector in the direction of \vec{w} [2 marks].