University of Lethbridge

Department of Mathematics and Computer Science

3rd October, 2016, 9:00 - 9:50 am

MATH 1410A - Test #1

Last Name:____

First Name:____

Student Number:_____________________________________

Tutorial Section: _____________________________________

Record your answers below each question in the space provided. Left-hand pages may be used as scrap paper for rough work. If you want any work on the left-hand pages to be graded, please indicate so on the right-hand page.

Partial credit will be awarded for partially correct work, including intermediate steps. (You should show your work if you want to earn part marks.) Unless otherwise indicated, failure to justify your work may result in loss of marks, even for a correct answer.

No external aids are allowed, with the exception of a 5-function calculator.

For grader's use only:

Page	Grade
2	/14
3	/14
4	/12
5	/10
Total	/50

B

1. Given the complex numbers $z = 1 + 3i$ and $w = 2 - 2i$, compute the following. You do not need to explain your work.

[2] (a) $z + w$

[2] (b) $\overline{z}$

[2] (c) $|w|$

[2] (d) zw

[3] (e) $\dfrac{z}{w}$

[3] (f) The polar form of w.

2. Given the vectors $\vec{v} = \langle 0, 3, -2 \rangle$ and $\vec{w} = \langle -1, 1, 4 \rangle$, compute the following. You do not need to explain your work.

[2] (a) $\vec{v} - 3\vec{w}$

[2] (b) $\|\vec{v}\|$

[2] (c) $\vec{v} \cdot \vec{w}$

[4] (d) $\vec{v} \times \vec{w}$

[4] (e) $\text{proj}_{\vec{v}}\, \vec{w}$

[3] 3. (a) Verify that $z = -\sqrt{2} - i\sqrt{2}$ can be written in the polar form $z = 2e^{i(5\pi/4)}$.

[5] (b) Compute the power $(-\sqrt{2} - i\sqrt{2})^5$. Express your answer in the form $x + iy$.

[4] 4. Find the point of intersection of the line $\langle x, y, z\rangle = \langle 4, -1, 3\rangle + t\langle 2, 0, -1\rangle$ and the plane $x + 3y - 2z = 3$.

[4] 5. Find the vector equation of the line ℓ that passes through the points $P = (0, 3, -2)$ and $Q = (1, 4, -1)$.

[6] Compute **one** of the following two distances. To earn full marks, your solution must include a clearly labelled diagram.

- From the point $P = (4, 5, 2)$ to the line $\langle x, y, z\rangle = \langle 2, 1, -1\rangle + t\langle 0, 1, 2\rangle$, or
- From the point $P = (2, 5, 8)$ to the plane $2x - 3y + z = 4$.