Practice problems List 5 MATH1104C

Here is a list of problems for you to practice. Practicing is essential for doing well in this course. Solutions to these problems can be found at the end.

Complex Numbers

1. Find real part Re z and the imaginary part Im z of the following complex numbers:

a) $z = 3 - 4i$ b) $z = -7$ c) $z = \sqrt{2} - \sqrt{3}i$ d) $z = -4i$ e) $z = -6i - 4$.

2. Find $\overline{z}$ (the conjugate of z) if

a) $z = -6 + 7i$ b) $z = -2i$ c) $z = 9$

3. Apply the following operations on complex numbers and write your answers in the standard form (that is, in the form $a + bi$)

a) $(-4 + 5i) + (-8 + 3i)$ b) $5(-2 + 3i) - 4(9 - 2i) + 11$

c) $-9i + (2 - 5i) + 8(-5 + 2i)$ d) $(-3 + 5i)(7 - 2i) + (-1 + i)$

e) $5(-1 + i)(-5 + 3i) - 2(2 - i)(5 - 2i)$ f) $\dfrac{-6 + 3i}{-3 + 4i}$

g) $\dfrac{-1 + 2i}{-3 - i}$ h) $\dfrac{-3 + 5i}{-1 + 2i} - \dfrac{3i}{2 + 2i}$ i) $\dfrac{6 - i}{2 - 3i} + \dfrac{5 - 4i}{3 + 2i}$

j) i^7 k) $(2i)^9$ l) $(-5 + 2i)^3$ m) $(1 - 2i)^4$

Solutions:

1. a) Re $z = 3$ and Im $z = -4$ b) Re $z = -7$ and Im $z = 0$
c) Re $z = \sqrt{2}$ and Im $z = -\sqrt{3}$ d) Re $z = 0$ and Im $z = -4$
e) Re $z = -4$ and Im $z = -6$.

2. a) $\overline{z} = -6 - 7i$ b) $\overline{z} = 2i$ c) $\overline{z} = 9$.

3. a) $-12 + 8i$ b) $-35 + 23i$ c) $-38 + 2i$ d) $-12 + 42i$ e) $-6 - 22i$

f) $\frac{6}{5}+\frac{3}{5}i$ g) $\frac{1}{10}-\frac{7}{10}i$ h) $\frac{37}{20}-\frac{11}{20}i$ i) $\frac{22}{13}-\frac{6}{13}i$ j) $-i$ k) $512i$

l) $-65+142i$ m) $-7+24i$