

U3/L7 HW (handout)

1. a) $(4+2i) + (3-4i)$
 $= 7-2i$

b) $(3-2i) - (1+3i)$
 $= 2-5i$

2. a) $-4i(3-5i)$
 $= -12i + 20i^2$
 $= -12i - 20$
 or $-20-12i$

b) $(2-4i)(1+3i)$
 $= 2 + 6i - 4i - 12i^2$
 $= 2 + 2i - 12(-1)$
 $= 14 + 2i$

c) $(4i-3)^2$
 $= 16i^2 - 24i + 9$
 $= 16(-1) - 24i + 9$
 $= -7 - 24i$

d) $(5-2i)(5+2i)$
 $= 25 - 4i^2$
 $= 25 - 4(-1)$
 $= 29$

3. $x^2 + 4x + 6 = 0$
 $x = \frac{-4 \pm \sqrt{16 - 24}}{2}$
 $= \frac{-4 \pm \sqrt{-8}}{2}$
 $= \frac{-4 \pm 2i\sqrt{2}}{2}$
 $= -2 \pm i\sqrt{2}$

4. $x^2 = 8x - 19$
 $x^2 - 8x + 19 = 0$
 $x = \frac{8 \pm \sqrt{64 - 4(19)}}{2}$
 $= \frac{8 \pm \sqrt{64 - 76}}{2}$
 $= \frac{8 \pm \sqrt{-12}}{2}$
 $= \frac{8 \pm 2i\sqrt{3}}{2}$
 $= 4 \pm i\sqrt{3}$

Check $4+i\sqrt{3}$
 L.S. $= (4+i\sqrt{3})^2$
 $= 16 + 8i\sqrt{3} + i^2(3)$
 $= 16 + 8i\sqrt{3} - 3$
 $= 13 + 8i\sqrt{3}$
 R.S. $= 8(4+i\sqrt{3}) - 19$
 $= 32 + 8i\sqrt{3} - 19$
 $= 13 + 8i\sqrt{3}$
 L.S. = R.S.

5. $i^2 = -1$
 $i^3 = i^2 \cdot i$
 $= -i$
 $i^4 = i^2 \cdot i^2$
 $= (-1)(-1)$
 $= 1$
 $i^5 = i^4 \cdot i$
 $= i$
 $i^6 = i^5 \cdot i$
 $= i^2$
 $= -1$
 $i^7 = i^6 \cdot i$
 $= -i$
 $i^8 = i^7 \cdot i$
 $= i^2$
 $= -1$

$i^2 = -1$
 $i^3 = -i$
 $i^4 = 1$
 $i^5 = i$
 $i^6 = -1$
 $i^7 = -i$
 $i^8 = 1$
 $i^9 = i$

When the exponent is an even number, the result is 1 or -1.
 When the exp. is odd, the result is -i or i.

$i^9 = i^8 \cdot i$
 $= i$