Name: _____ Date: _____

QUIZ – COMPLEX NUMBERS

1. (66%) Given that $z_1 = 1 - i$, $z_2 = 2 + 4i$, , $z_3 = -1 + \sqrt{3}\, i$.

a. (2%) $z_1 + z_2 - z_3 =$

b. (8%) $|z_1| =$ $|z_2| =$ $\text{Arg}(z_1) =$ $\text{Arg}(z_3) =$

c. (6%) Write z_3 in the polar form:

d. (8%) Find $z_1 z_3$ using the polar form.

e. (4%) Find $z_2 z_2^{*} =$

f. (8%) Find $(z_3)^5$ in the polar form = =

g. (8%) Find $\frac{z_3}{z_1}$ in the polar form =

h. (8%) $Arg(\frac{z_3^{\,2}}{\sqrt{z_1}}) =$

i. (4%) Sketch the Argand Diagram of z_3, include the relevant scale in the x and y axis.

j. (10%) Find all values of : $\sqrt[5]{z_3}$ =

2. (16%) If z is a complex number and $|z| = |z + 2| + 1$, find the Re(z).

3. (18%) Given that 2i is a solution of the equation $x^4 + x^3 + 5x^2 + 4x + 4 = 0$

   a. (12%) Find all the other solutions.
   b. (6%) Write down the factorized polynomial.