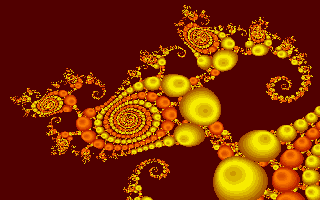
**Complex number**

**Evaluate:**

**(1)**

**(2)** .

**Solve for all roots (including complex number roots):**

**(3)**

**(4)** .

Beautiful fractal diagram begins with a complex number.

**(1)** **Method 1**

Since ,

**Method 2** Note:

, by de Morivre’s Theorem

**Method 3**

Let

… (1)

… (2)

We also find

**(2)**

**(3) Method 1**

Let

By quadratic eq. formula,

, where k = 0, 1, 2.

When k = 0,

When k = 1,

When k = 2,

**Method 2**

For , k = 0, 1, 2, …, 8

For , k = 0, 1, 2.

Hence the roots are .

**(4)** **Method 1**

, k = 0, 1, 2, 3, 4.

When k = 0,

When k = 1,

When k = 2,

When k = 3,

When k = 4,

**Method 2**

Therefore or

**Yue Kwok Choy**

**20/8/2015**