

## Quiz #2

Monday, September 25 2017

**Duration: 20 min**

**NAME:** \_\_\_\_\_

**Please write clearly and properly. Justify your answers carefully.**

<b>Problem</b>	<b>Grade</b>
<b>1</b>	
<b>2</b>	
<b>Total</b>	

**Problem 1** (~ 3 points).

Let  $z = 1 + i$ . Compute  $z^8$ .

**Problem 2** (~ 9 points).

For any integer  $n \geq 2$ , let us denote  $U_n$  the set of  $n$ -th roots of unity in  $\mathbb{C}$ :

$$U_n = \{z \in \mathbb{C} \mid z^n = 1\} .$$

- (1) Let  $n = 2$ . List the elements of  $U_n$ , both in algebraic and polar form. Draw the set  $U_n$  in the plane. Check that  $\sum_{z \in U_n} z = 0$  and  $\prod_{z \in U_n} z = \pm 1$ .

*We recall that  $\sum_{z \in U_n} z$  denotes the sum of all elements in  $U_n$ , and  $\prod_{z \in U_n} z$  denotes the product of all elements in  $U_n$ .*



(2) Same question for  $n = 3$ .



(3) Same question for  $n = 4$ .

