

Math 112 Homework for Tuesday, Week 12

1. Using limit theorems find the following limits. Note that your answer should be simplified to the number of the form  $a + ib$ .

(a)  $\lim_{x \rightarrow 2} \frac{(x^3 - 4x - 27)^3}{(x^2 + 5)^2}$

(b)  $\lim_{x \rightarrow i} (1 + x)^3$

(c)  $\lim_{x \rightarrow 1+i} \frac{1}{(x - 2)^2}$

2. Prove that if  $\lim_{x \rightarrow a} f(x) = L$ , then  $\lim_{x \rightarrow a} |f(x)| = |L|$ .

3. Let  $c \in \mathbb{C}$ . Prove that

(a) The function  $f: \mathbb{C} \rightarrow \mathbb{C}$  given by  $f(z) = z + c$  is continuous.

(b) The function  $g: \mathbb{C} \rightarrow \mathbb{C}$  given by  $g(z) = cz$  is continuous.