Quiz11, MAT 1375 Professor Chiu

ID:_____ Name:_____

- This quiz consists of 2 sets of questions for a total of 10 points.
- You have 15 minutes to complete the quiz.
- Scientific calculators are allowed.
- Wishing you success.

True or False questions:

1. F If f is a degree 3 polynomial, then it is possible for f to have two real roots and one complex root. ⇒ complex roots always show as a pair.

2. T If f has a complex root c, then its conjugate $\bar{c}$ is also a root of f.

3. T If f is a degree 5 polynomial, then f has at most 5 roots.

4. T Given $f(x) = x^3 + 7x^2 + 7x - 15$. Then $x = 1$ is a root of f.

Show all your work and justify your answer:

5. Let $f(x) = x^3 + 2x^2 - 11x + 8$. Find all the roots of $f(x)$.

(i) Education guess of root: the factor of "8": $\pm 1, \pm 2, \pm 4, \pm 8$

(ii) Check the roots:

① $x=1$, $f(1) = 1^3 + 2\cdot 1^2 - 11\cdot 1 + 8 = 0 \Rightarrow x=1$ is a root!

(iii) $x=1 \Rightarrow (x-1)$ is a factor of $f(x)$:

$f(x) = (x-1)\cdot(x^2+3x-8)$

$x-1 \;\big|\; x^3+2x^2-11x+8$

$-(x^3-x^2)$

$3x^2-11x$

$-(3x^2-3x)$

$-8x+8$

$-(-8x+8)$

0

$[x^2+3x-8]$

(iv) Find root of $f \Rightarrow f(x)=0$

$f(x) = (x-1)(x^2+3x-8) = 0$

$\Rightarrow (x-1)=0$ or $x^2+3x-8=0$

$\Rightarrow$ $x=1$ or $x = \dfrac{-3 \pm \sqrt{41}}{2}$