Quiz 6 Name: Key

Math 115, Fall 2016 Thursday Discussion Time: _____

Directions: You have 20 minutes to complete this quiz. Read each problem carefully. There are three problems on the back of this page. Please put a box around your answers. No calculators are allowed.

1. (3 points)

   Use long division or synthetic division to determine the **quotient** and **remainder** when the polynomial $x^3 - 3x^2 + 2x - 4$ is divided by $x + 2$.

$$\begin{array}{r|rrrr} -2 & 1 & -3 & 2 & -4 \\ & & -2 & 10 & -24 \\ \hline & 1 & -5 & 12 & -28 \end{array}$$

quotient = $x^2 - 5x + 12$

remainder = -28

2. (1 point)

   If $x - 7$ is a factor of the polynomial function, what is the value of $p(7)$?

$p(7) = 0$ because if $x - 7$ is a factor, then 7 is a zero.

3. (3 points)

Let $p(x) = x^3 - 7x + 6$. Given that $x = 2$ is a zero, find all of the zeros of $p(x)$.

$x-2$ is a factor

$$\begin{array}{r|rrrr} 2 & 1 & 0 & -7 & 6 \\ & & 2 & 4 & -6 \\ \hline & 1 & 2 & -3 & 0 \end{array} \qquad x^2 + 2x - 3$$

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

Zeros: $x = -3,\ x = 1,\ x = 2$

4. (1 point)

Use the Rational Zero Theorem to determine all of the **possible** rational zeros of the polynomial $2x^7 - x^4 + 3x^2 + 5$. (You do not need to find all of the **actual** zeros.)

$\frac{p}{q} = \pm \frac{\text{factors of } 5}{\text{factors of } 2} = \pm \frac{1, 5}{1, 2}$; possible rational zeros: $\pm 1, \pm \frac{1}{2}, \pm \frac{5}{2}, \pm 5$

5. (2 points)

Write the following in the form $a + bi$.

(a) $4 + 5i - (4 - 10i)$

$4 + 5i - 4 + 10i = \boxed{15i}$

(b) $(2 + i)(3 - 2i)$

$= 6 - 4i + 3i - 2i^2$

$= 6 - i - 2(-1) = \boxed{8 - i}$