Name ______________________________ Student No._____ G___/_____ Date: _____________Score: ______
Nickname: ______________________________ Quiz No.: ________

Factoring using Mixed Methods

A. Factor completely the given polynomial expressions.

1) $-8x^5 + 8x^3 + 8x^2 - 8$

Factored Form:
$-8\left(x-1\right)^2\left(x+1\right)\left(x^2+x+1\right)$

2) $x^6 - 64$

Factored Form:
$\left(x-2\right)\left(x+2\right)\left(x^2-2x+4\right)\left(x^2+2x+4\right)$

Remainder Theorem

B. Give the remainder of each of the following expressions using remainder theorem.

1) $(-2x^4 - 5x^3 + 7x^2 + 9x - 9) \div (-x - 2)$

Remainder: -35

2) $(-x^3 + 3x^2 + x - 3) \div (2x + 2)$

Remainder: 0

Factor Theorem

C. State if the given binomial is a factor of the given polynomial.

1) $(x^2 - 4x + 3) \div (2 - 2x)$

Answer: Factor

2) $(-8x^4 + 16x^3 + 34x^2 - 24x - 18) \div (-2x - 3)$

Answer: Factor

Rational Root Theorem

D. Identify the nature of the roots (table of variations), the number of roots (FTA), possible roots, actual roots and the factored form of the given polynomial.

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

FTA: Atmost 3
Factored form: $-(x-1)(x+1)(x+3)$
Actual roots: -3, -1, 1

2) $f(x) = x^5 - 8x^3 + 6x^2 + 7x - 6$

FTA: Atmost 5
Factored form: $(x-2)(x-1)^2(x+1)(x+3)$
Actual roots: -3, -1, 1 mul. 2, 2

Graphing Polynomial

E. Give the possible roots (RRT), nature of roots (DRS), number of roots (FTA), factored form, actual roots, end behavior and graph of the given polynomial.

1) $f(x) = -x^4 + 2x^3 - 2x + 1$

FTA: Atmost 4
Factored form: $-\left(x-1\right)^3\left(x+1\right)$
Actual roots: -1, 1 mul. 3
End Behavior:

$f(x) \rightarrow\ -\infty\ \ as\ \ x \rightarrow -\infty$
$f(x) \rightarrow -\infty\ \ as\ \ x \rightarrow \infty$

Graph:

2) $f(x) = -2x^5 - 15x^4 - 34x^3 - 12x^2 + 36x + 27$

FTA: Atmost 5
Factored form: $-\left(x-1\right)\left(x+1\right)\left(x+3\right)^2 \cdot \left(2x+3\right)$
Actual roots: -3 mul. 2, -3/2, -1, 1
End Behavior:

$f(x) \rightarrow\ \infty\ \ as\ \ x \rightarrow -\infty$
$f(x) \rightarrow -\infty\ \ as\ \ x \rightarrow \infty$

Graph: