

Name \_\_\_\_\_ Student No. \_\_\_\_\_ G\_\_\_\_/\_\_\_\_ Date: \_\_\_\_\_ Score: \_\_\_\_\_  
Nickname: \_\_\_\_\_ Quiz No.: \_\_\_\_\_

## Factoring using Mixed Methods

**A. Factor completely the given polynomial expressions.**

1)  $x^6 - 2x^3 + 1$

2)  $216x^6 - 19x^3 - 1$

Factored Form:  
 $(x - 1)^2 (x^2 + x + 1)^2$

Factored Form:  
 $(2x - 1)(3x + 1)(4x^2 + 2x + 1)(9x^2 - 3x + 1)$

## Remainder Theorem

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

1)  $(4x^4 - 18x^3 + 12x^2 + 22x - 12) \div (-x - 3)$

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

Remainder: 2268

Remainder: -2

## Factor Theorem

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

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

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

Answer: Not a Factor

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

2)  $f(x) = -2x^5 + 5x^4 + 8x^3 - 14x^2 - 6x + 9$

FTA: Atmost 3

Factored form:  $-(x-2)(x+1)(x+2)$

Actual roots: -2, -1, 2

FTA: Atmost 5

Factored form:  $-(x-3)(x-1)^2(x+1)(2x+3)$

Actual roots: -3/2, -1, 1 mul. 2, 3

## 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.**

$$1) f(x) = -x^4 - 8x^3 - 22x^2 - 24x - 9$$

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

FTA: Atmost 4  
 Factored form:  $-(x+1)^2(x+3)^2$   
 Actual roots: -3 mul. 2, -1 mul. 2  
 End Behavior:

$$f(x) \rightarrow -\infty \text{ as } x \rightarrow -\infty$$

$$f(x) \rightarrow -\infty \text{ as } x \rightarrow \infty$$

Graph:

FTA: Atmost 4  
 Factored form:  $-(x-1)^2(x+1)(x+2)$   
 Actual roots: -2, -1, 1 mul. 2  
 End Behavior:

$$f(x) \rightarrow -\infty \text{ as } x \rightarrow -\infty$$

$$f(x) \rightarrow -\infty \text{ as } x \rightarrow \infty$$

Graph: