Name _____ Date _____ Period _____

The Factor and Remainder Theorems

1. Find the remainder for each division. Is the divisor a factor of the polynomial?

a. $(2x^3 + 3x^2 - 8x + 3) \div (x + 3)$

Remainder: 0
Yes, the divisor is a factor.

b. $(2x^4 + 4x^3 - x^2 + 9) \div (x + 2)$

Remainder: 5
No, the divisor is not a factor.

c. $(x^4 + 5x^3 - 14x^2) \div (x + 7)$

Remainder: 0
Yes, the divisor is a factor.

d. $(4x^3 - 13x + 10) \div (2x - 1)$

Remainder: 4
No, the divisor is not a factor.

2. Is $(x + 3)$ a factor of the polynomial $P(x) = x^3 - x^2 - 13x - 3$? Show your work.

Yes, x + 3 is a factor.

3. Is $(x + 4)$ a factor of the polynomial $P(x) = x^5 + 8x^4 + 17x^3 + 8x^2 + 12x - 17$? Show your work.

No, x + 4 is not a factor.

4. Is $(n + 2)$ a factor of the polynomial $P(x) = -3n^3 - 4n^2 - 7$? Show your work.

No, n + 2 is a factor.

5. Find the value of k so that each remainder is zero.

a. $(x^2 + kx - 6) \div (x + 1)$

k = -5

b. $(2x^3 + kx^2 + 7x - 2) \div (x - 2)$

k = -7

6. Given polynomial f(x) and a factor of f(x), factor f(x) completely.

a. $f(x) = x^3 - 10x^2 + 19x + 30; x - 6$

(x – 6)(x – 5)(x + 1)

b. $f(x) = x^3 - 2x^2 - 40x - 64; x - 8$

(x – 8)(x + 4)(x + 2)

c. $f(x) = x^3 + 2x^2 - 51x + 108; x + 9$

(x +9)(x – 4)(x - 3)

d. $f(x) = 2x^3 - 15x^2 + 34x - 21; x - 1$

(x – 1)(2x – 7)(x – 3)

7. Given polynomial function f(x) and a zero of f(x), find the other zeros.

a. $f(x) = 4x^3 - 25x^2 - 154x + 40; 10$

x = .25

x = -4

b. $f(x) = 5x^3 - x^2 - 18x + 8; -2$

$$x = \frac{11 \pm \sqrt{41}}{10}$$