

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Math 12  
Polynomials Quiz – Part 2

1. Use the remainder theorem to determine the remainder of each division.

a)  $x^3 + 9x^2 - 5x + 3 \div x - 2$

b)  $12x^3 + 13x^2 - 23x + 7 \div x - 2$

$P(2) = 37$

$P(2) = 109$

2. Perform each division using the indicated method. Express the result in the form

$$\frac{P(x)}{x-a} = Q(x) + \frac{R}{x-a}$$

a)  $x^3 + 9x^2 - 5x + 3 \div x - 2$  using

long division.

$$\begin{array}{r} x^2 + 11x + 17 \\ x-2 \overline{) x^3 + 9x^2 - 5x + 3} \\ \underline{-x^3 + 2x^2} \phantom{+ 3} \\ 11x^2 - 5x \phantom{+ 3} \\ \underline{-11x^2 + 22x} \phantom{+ 3} \\ 17x + 3 \\ \underline{-17x + 34} \\ 37 \end{array}$$

b)  $12x^3 + 13x^2 - 23x + 7 \div x - 2$

using synthetic division.

$$\begin{array}{r|rrrr} 2 & 12 & 13 & -23 & 7 \\ & & 24 & 74 & 102 \\ \hline & 12 & 37 & 51 & 109 \end{array}$$
$$\begin{array}{r} 12x^3 + 13x^2 - 23x + 7 \\ \underline{-12x^2 + 24x} \\ 13x^2 - 23x + 7 \\ \underline{-13x^2 + 26x} \\ -23x + 7 \\ \underline{-23x + 46} \\ 39 \end{array}$$

3. Determine the value of  $m$  and  $n$  such that when  $f(x) = x^4 + mx^3 - nx - 5$  is divided by  $x - 3$ , the remainder is  $-14$ . When  $f(x)$  is divided by  $x - 2$  the remainder is  $-19$ .

$$3^4 + m(3)^3 + 3n - 5 = -14$$

$$\frac{27m + 3n}{3} = \frac{-90}{3}$$

$$9m + n = -30$$

$$-4m - n = 15$$

$$5m = -15$$

$$m = -3$$

$$2^4 + m(2)^3 + 2n - 5 = -19$$

$$16 + 8m + 2n - 5 = -19$$

$$8m + 2n = -30$$

$$-4m - n = 15$$

$$-4(3) - n = 15$$

$$-12 - n = 15$$

$$-n = 27$$
$$n = -27$$

4. Which binomials are factors of the polynomial  $P(x) = x^3 - x^2 - 16x + 16$ ?

- a)  $x - 1$   $f(1) = 0$   
b)  $x + 1$   $f(-1) = -2$   
c)  $x + 4$   $f(-4) = 0$   
d)  $x - 4$   $f(4) = 0$

5. Factor fully.

a)  $x^3 - 4x^2 + x + 6$

b)  $x^4 - 4x^3 - x^2 + 16x - 12$

$$(x+1)(x-3)(x-2)$$

$$(x-2)(x-1)(x-3)(x+2)$$