Chapter 3

## Section 3.2 The Remainder Theorem Dav 2

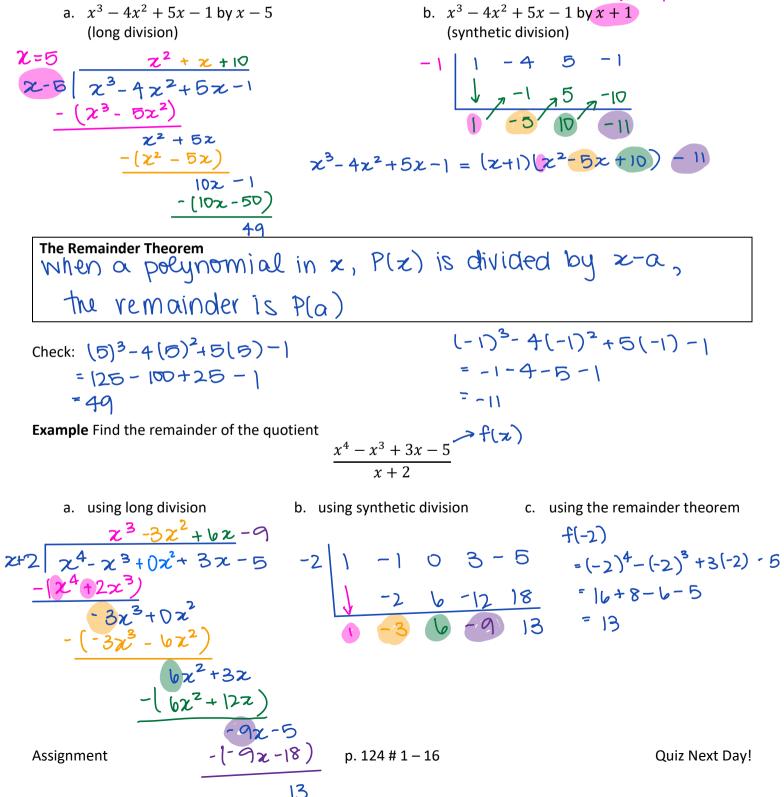
**Polynomial Functions** 

Name:

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Learning Goal 3.2	Factoring, including the factor theorem and the remainder theorem.
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Example Divide each of the following and provide a division statement. Identify any restrictions on the variable.



Chapter 3

## Section 3.2 The Remainder Theorem Day 2

f(x) = **Example** When  $x^3 + 3x^2 - kx + 10$  is divided by x - 5, the remainder is 15. Find the value of k.

$$f(6) = 16 = (5)^{3} + 3(6)^{2-} + (6) + 10$$
  

$$16 = 126 + 76 - 5k + 10$$
  

$$15 = 210 - 5k$$
  

$$-210 - 210$$
  

$$-195 = -5k$$

**Example** When  $P(x) = 3x_{\pm}^2 mx^2 + nx - 7$  is divided by  $x = \frac{2}{2}$ , the remainder is -3. When P(x) is divided by x = 1, the remainder is -18. What are the values of m and n.

$$P(2) = -3 = 3(2)^{3} + m(2)^{2} + n(2)^{-7}$$

$$P(-1) = -18 = 3(-1)^{3} + m(-1)^{2} + n(-1)^{-7}$$

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$$P(-1) = -18 = -3 + m(-1)^{-7}$$

$$P(-1)$$

**Exmaple**  $f(x) = x^4 + 3x^2 + 2$  has the same remainder as  $g(x) = x^5 + mx^4 + x^3$  when divided by x - 2. Determine the value of m.

 $f(2) = (2)^{4} + 3(2)^{2} + 2$ = 16 + 12 + 2= 30 $g(2) = (2)^{5} + M(2)^{4} + (2)^{3}$ = 32 + 16m + 8= 40 + 16m

$$30 = 40 + 16m$$
  
- 10 = 16m  
 $M = -\frac{10}{16} = -\frac{5}{8}$