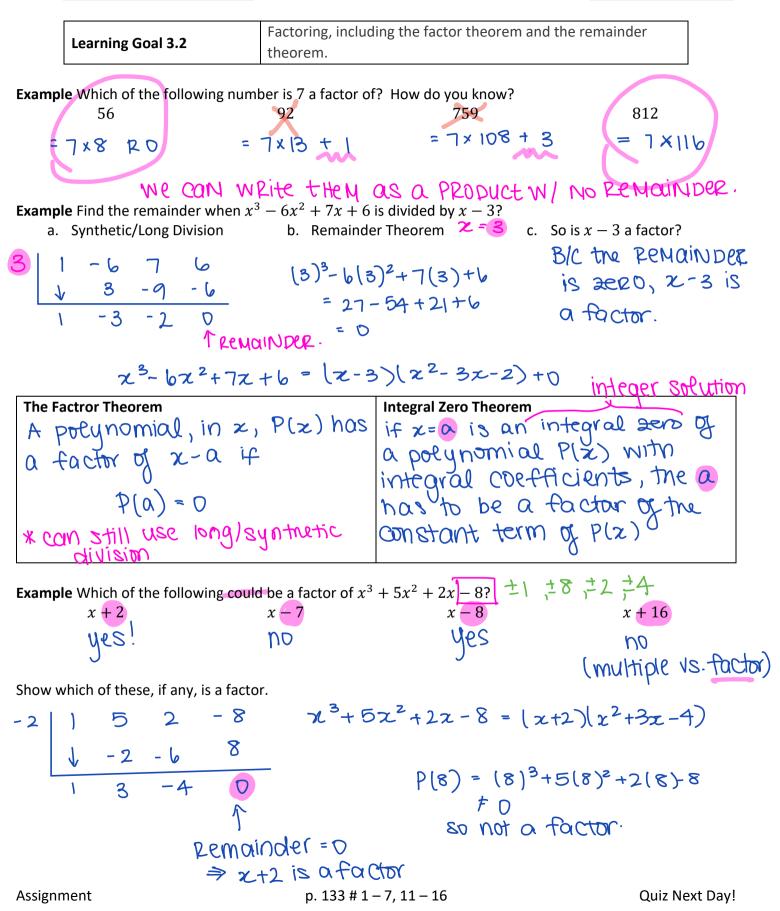
## Chapter 3

**Polynomial Functions** 

Name:

Date:



## Can't use synthetic division. Section 3.3 The Factor Theorem

Chapter 3

**Polynomial Functions** 

**Example** Verify that 2x - 3 is a factor of  $2x^3 - 5x^2 - x + 6$  in two different ways.

$$\frac{x^2 - x - 2}{2x^3 - 5x^2 - x + 6}$$

$$P\left(\frac{3}{2}\right) = 2\left(\frac{3}{2}\right)^3 - 5\left(\frac{3}{2}\right)^2 - \frac{3}{2} + 6$$

$$= 2\left(\frac{27}{5}\right) - 5\left(\frac{9}{4}\right) - \frac{3}{2} + 6$$

$$= 0$$

$$= -\left(\frac{-2x^2 + 3x}{4}\right)$$

$$= 0$$

$$= 0$$

$$\int \frac{-4x + 6}{6}$$

$$= -\frac{(-4x + 6)}{6}$$
Because the remainder is acro, 2x - 3 + 6 = 3 + 6 + 24
$$= 0$$

$$\int \frac{1}{5}$$

$$= 0$$

$$= 0$$

$$\int \frac{1}{5}$$

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SP(x)

$$P(3) = 0 = 2(3)^{3} - k(3)^{2} - 4(3) + 3$$
  

$$D = 54 - 9k - 12 + 3$$
  

$$D = 45 - 9k$$
  

$$9k = 45$$
  

$$k = 5$$

By the integral zero theorem, the only possible integer factors will be x+1 and x-3 **Example** Factor  $x^3 - x^2 - 5x - 3$  fully. -1 1 -1 -5 -3  $\sqrt{-1}$  2 3  $\sqrt{-1}$  2 3  $\sqrt{-1}$  2 -2 -2  $\sqrt{-2}$   $\sqrt{-1}$  $= (\chi + I)(\chi^{2} - 2\chi - 3) - \frac{3}{-3} \times \frac{I}{-3} = -3$ =  $(\chi + I)(\chi - 3)(\chi + I)$ =  $(\chi + I)^{2}(\chi - 3)$