Section 5.2: Synthetic division

(3x<sup>2</sup>-2x+5 is prime)

#1- 10:

a) Perform the division using synthetic division.

b) if the remainder is 0 use the result to completely factor (the dividend is the numerator or the polynomial to the left of the division sign.)

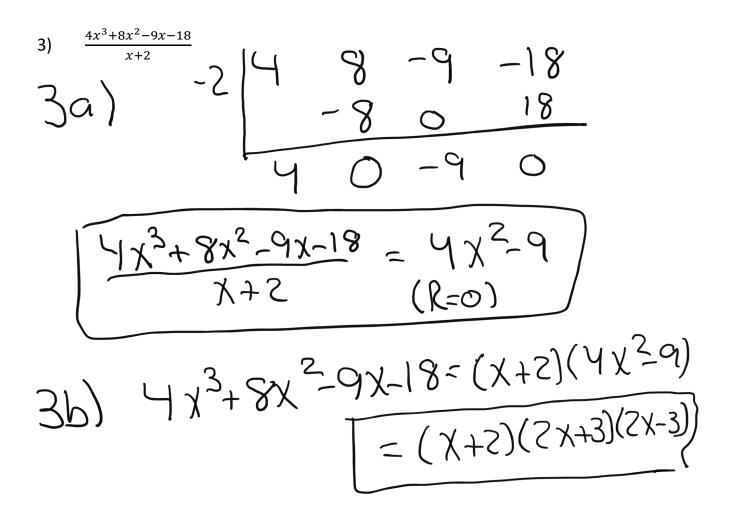
1) 
$$\frac{3x^3 - 17x^2 + 15x - 25}{x - 5}$$
  
(a)  $5 = 3 - 17 + 15 - 25$   
(b)  $15 - 10 + 25$   
 $3 - 2 + 5 = 0$ 

$$\frac{3x^{3} - 17x^{2} + 15x - 25}{x - 5} = 3x^{2} - 2x + 5}{(R = 0)}$$

 $1b) 3x^{3} - 17x^{2} + 15x - 25 = (x - 5)(3x^{2} - 2x + 5)$ 

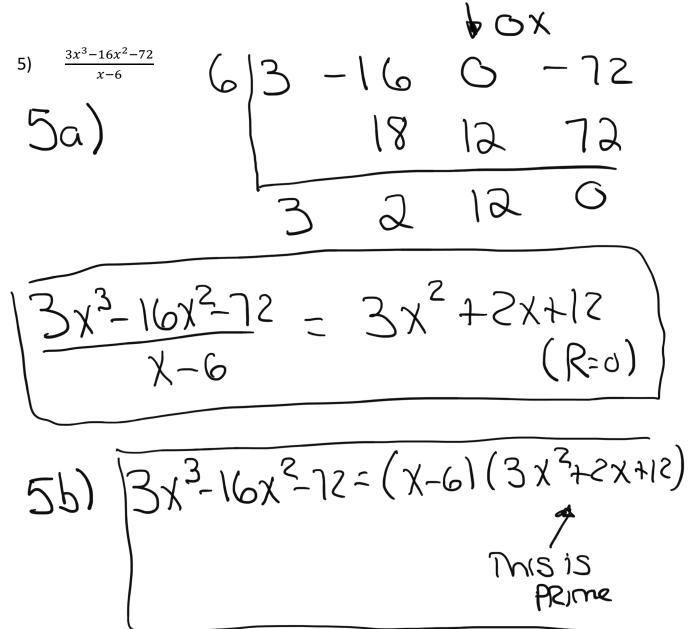
a) Perform the division using synthetic division.

b) if the remainder is 0 use the result to completely factor the dividend (the dividend is the numerator or the polynomial to the left of the division sign.)



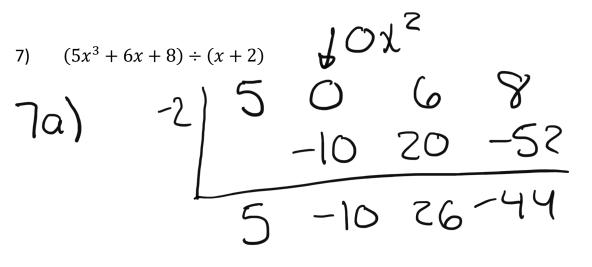
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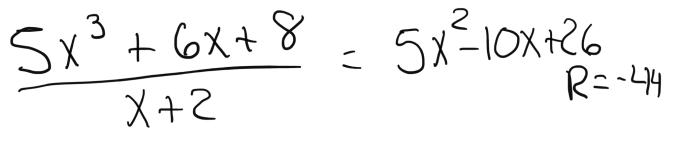
b) if the remainder is 0 use the result to completely factor the dividend (the dividend is the numerator or the polynomial to the left of the division sign.)

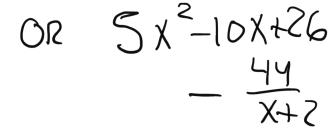


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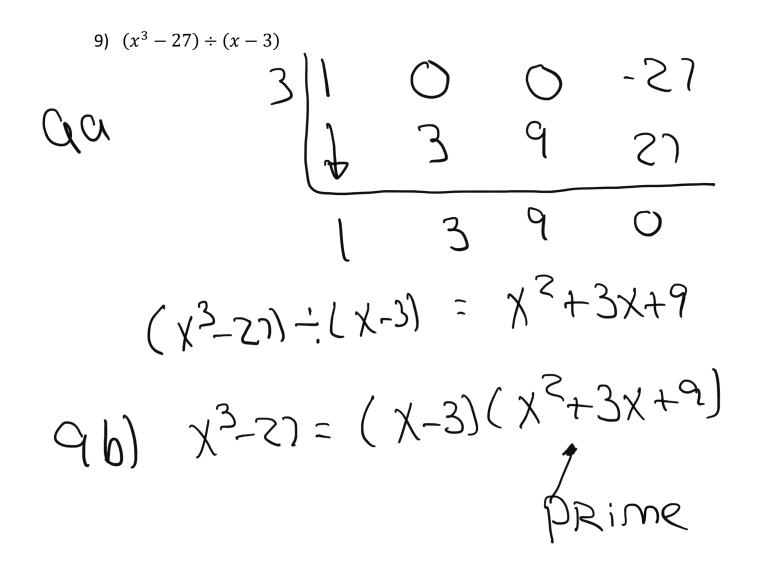




76) Skip PARt b Since RemainDer not O

a) Perform the division using synthetic division.

b) if the remainder is 0 use the result to completely factor the dividend (the dividend is the numerator or the polynomial to the left of the division sign.)



a) use your graphing calculator, or the rational root theorem to find a x-intercept of the polynomial

b) use synthetic division to completely factor the polynomial

11) 
$$f(x) = x^3 + 2x^2 - 5x - 6$$

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11a)  
(1b)  
 $-3(1 \ 2 \ -5 \ -6)$   
 $-3(1 \ 2 \ -5 \ -6)$   
 $-3 \ 3 \ 6$   
 $-3 \ 3 \ 6$   
 $-3 \ 3 \ 6$   
 $-1 \ -2 \ 0$   
 $\chi^3 + 2 \ \chi^2 - 5 \ \chi - 6 = (\chi + 3)(\chi^2 - \chi - 2)$   
 $= (\chi + 3)(\chi + 1)(\chi - 2) = 0$   
 $\chi + 3 = 0 \ \chi + 1 = 0 \ \chi - 2 = 0$   
 $\chi + 3 = 0 \ \chi + 1 = 0 \ \chi - 2 = 0$   
 $\chi = -3 \ \chi = -1 \ \chi = 2$   
 $\overline{\chi = -3 - 1, 2}$ 

a) use your graphing calculator, or the rational root theorem to find a x-intercept of the polynomial

b) use synthetic division to completely factor the polynomial

$$\begin{array}{c} 13) \ f(x) = 2x^{3} - 13x^{2} + 24x - 9 \\ \hline 13a) \quad \chi = 3 \\ \hline 13b) \quad 3 \begin{bmatrix} 2 & -13 & 24 - 9 \\ 6 & -21 & 9 \\ 2 & -7 & 3 & 0 \end{bmatrix} \\ \hline 2 & -7 & 3 & 0 \\ \hline 2 & -7 & 3 & 0 \\ \hline 2 & -7 & 3 & 0 \end{bmatrix} \\ \hline 2 & \chi^{3} - \sqrt{3}\chi^{2} + 24x - 9 = (\chi - 3)(2\chi^{2} - 7\chi + 3) \\ \hline 2 & \chi^{3} - \sqrt{3}\chi^{2} + 24\chi - 9 = (\chi - 3)(2\chi^{2} - 7\chi + 3) \\ = (\chi - 3)(2\chi - 1)(\chi - 3) \\ = (\chi - 3)(2\chi - 1) \\ \hline 13c) \quad f(\chi) = 0 \\ (\chi - 3)(\chi - 3)(2\chi - 1) = 0 \\ (\chi - 3)(\chi - 3)(2\chi - 1) = 0 \\ (\chi - 3)(\chi - 3)(2\chi - 1) = 0 \\ \chi = 3 & \chi = 3 & 2\chi = 1 \\ \chi = \frac{1}{2} & \frac{1}{\chi = 3\frac{1}{2}} \end{array}$$

a) use your graphing calculator, or the rational root theorem to find a x-intercept of the polynomial

b) use synthetic division to completely factor the polynomial

15) 
$$f(x) = 6x^{3} - 29x^{2} - 62x + 120$$
  
15a)  $X = 6$   
15b)  $6 \begin{bmatrix} 6 & -29 & -62 & 120 \\ 36 & 42 & -120 \\ 6 & 7 & -20 & 0 \end{bmatrix}$   
 $6 & 7 & -20 & 0$   
 $6 & 7 & -20 & 0$   
 $6 & 7 & -20 & 0$   
 $6 & 7 & -20 & 0$   
 $6 & 7 & -20 & 0$   
 $6 & 7 & -20 & 0$   
 $(X - 6)(3X - 4)(2X + 5) = 0$   
 $(X - 6)(3X - 4)(2X + 5) = 0$   
 $X - 6 = 0 & 3X - 4 = 0 & 2X + 5 = 0$   
 $X = 6 & 3X - 4 = 0 & 2X + 5 = 0$   
 $X = 6 & 3X - 4 = 0 & 2X + 5 = 0$   
 $X = 6 & 3X - 4 = 0 & 2X + 5 = 0$   
 $X = 6 & 3X - 4 = 0 & 2X + 5 = 0$   
 $X = 6 & 3X - 4 = 0 & 2X + 5 = 0$   
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 $X = 6 & 3X - 4 = 0 & 2X + 5 = 0$   
 $X = 6 & 3X - 4 = 0 & 2X + 5 = 0$ 

a) use your graphing calculator, or the rational root theorem to find a x-intercept of the polynomial

b) use synthetic division to completely factor the polynomial

17) 
$$f(x) = x^{3} - 3x^{2} + 4x - 12$$
  
17a)  $\chi = 3$   
17b)  $3 \begin{bmatrix} 1 & -3 & 4 & -12 \\ 3 & 0 & 12 \\ 1 & 0 & 4 & 0 \end{bmatrix}$   
 $\chi^{3} - 3\chi^{2} + 4\chi - 12 = (\chi - 3)(\chi^{2} + 4)$   
 $\chi^{3} - 3\chi^{2} + 4\chi - 12 = (\chi - 3)(\chi^{2} + 4)$   
 $\chi^{-3} = 0$   
 $\chi - 3 = 0$   
 $\chi = 3$   
 $\chi^{2} = 4 = 0$   
 $\chi = 2 = 4 = 0$ 

a) use your graphing calculator, or the rational root theorem to find a x-intercept of the polynomial

b) use synthetic division to completely factor the polynomial

19) 
$$f(x) = x^{3} + 4x^{2} + 25x + 100$$
  
 $|9a| X = -4$   
 $|9b| -4| | 4 25 100$   
 $| 0 75 0$   
 $\chi^{3} + 4\chi^{2} + 25\chi + 100 = (\chi + 4)(\chi^{2} + 25)$   
 $\chi^{3} + 4\chi^{2} + 25\chi + 100 = (\chi + 4)(\chi^{2} + 25)$   
 $\chi^{3} + 4\chi^{2} + 25\chi + 100 = (\chi + 4)(\chi^{2} + 25)$   
 $\chi^{3} + 4\chi^{2} + 25\chi + 100 = (\chi + 4)(\chi^{2} + 25)$   
 $\chi^{3} + 4\chi^{2} + 25\chi + 100 = (\chi + 4)(\chi^{2} + 25)$   
 $\chi^{3} + 4\chi^{2} + 25\chi + 100 = (\chi + 4)(\chi^{2} + 25)$   
 $\chi^{3} + 4\chi^{2} + 25\chi + 100 = (\chi + 4)(\chi^{2} + 25)$   
 $\chi^{3} + 4\chi^{2} + 25\chi + 100 = (\chi + 4)(\chi^{2} + 25)$   
 $\chi^{4} + 4 = 0$   
 $\chi^{2} + 25 = 0$   
 $\chi^{2} = \frac{1}{2}, 25$   
 $\chi^{2} = \frac{1}{2}, 5i$