

6, 2 Synthetic Division (pg 343) Dividing Polynomials.

EX#4: $(2x^3 - 13x^2 + 20x - 24) \div (x - 4)$

$$\begin{array}{r|rrrrr} 4 & 2 & -13 & 20 & -24 & \\ & \downarrow & \nearrow 8 & \nearrow -20 & \nearrow 24 & \\ & & -2 & 5 & 6 & 0 \end{array}$$

$2x^2 - 5x + 6$

4A) $(2x^3 + 3x^2 - 4x + 15) \div (x + 3)$

$$\begin{array}{r|rrrrr} -3 & 2 & 3 & -4 & 15 & \\ & \downarrow & -6 & 9 & -15 & \\ & & -3 & 5 & 0 & \end{array}$$

$2x^2 - 3x + 5$

4D) $(6b^4 - 8b^3 + 12b - 14) \div (b - 2)$

$$\begin{array}{r|rrrrr} 2 & 6 & -8 & 0 & 12 & -14 \\ & \downarrow & \nearrow 12 & \nearrow -8 & \nearrow 16 & \nearrow -6 \\ & & 4 & 8 & 28 & 42 \end{array}$$

$6b^3 + 4b^2 + 8b + 28 + \frac{42}{b-2}$

EX#5: $(\frac{8}{3}x^4 - \frac{5}{3}x^3 + \frac{1}{3}x^2 + \frac{7}{3}x) \div (\frac{2}{3}x + \frac{1}{3})$

$$\begin{array}{r|rrrrr} -\frac{1}{2} & 1 & -\frac{5}{8} & \frac{1}{8} & \frac{7}{8} & 0 \\ & \downarrow & -\frac{1}{8} & \frac{2}{8} & -\frac{1}{8} & -\frac{7}{8} \\ & & 1 & -2 & 1 & 2 \end{array}$$

$x^3 - 2x^2 + x + 2 - \frac{2}{x + \frac{1}{2}}$

$x^3 - 2x^2 + x + 2 - \frac{2}{x + \frac{1}{2}}$

$(x^3 - 2x^2 + x + 2) \div (x + \frac{1}{2})$

$$\begin{array}{r} 3x+1 \overline{) 3x^4 - 5x^3 + x^2 + 7x + 0} \\ \underline{-3x^4 + x^3} \\ 6x^3 + x^2 \\ \underline{+ 6x^3 + 2x^2} \\ 3x^2 + 7x \\ \underline{-3x^2 + 1x} \\ 6x + 0 \\ \underline{-6x + 2} \\ -2 \end{array}$$

$\frac{2}{x + \frac{1}{2}} = \frac{2}{\frac{2x + 1}{2}} = \frac{4}{2x + 1}$

$\frac{3x + \frac{8}{3}}{3} = \frac{3x + \frac{8}{3}}{3}$

$\frac{2}{3} = \frac{2}{3} \cdot \frac{2x + 1}{2x + 1} = \frac{2(2x + 1)}{3(2x + 1)}$

REC.

$$\frac{2}{3(2x+1)} = \frac{2}{3} \cdot \frac{1}{2x+1} = \frac{2}{3} \cdot \frac{1}{2x+1}$$

6,2: Synthetic Division (pg. 343) Dividing Polynomials

Ex #4: $(2x^3 - 13x^2 + 26x - 24) \div (x - 4)$

$$\begin{array}{r|rrrrr} 4 & 2 & -13 & 26 & -24 & \\ & & 8 & -20 & 24 & \\ \hline & 2 & -5 & 6 & 0 & \end{array}$$

$2x^2 - 5x + 6$

4A) $(2x^3 + 3x^2 - 4x + 15) \div (x + 3)$

$$\begin{array}{r|rrrrr} -3 & 2 & 3 & -4 & 15 & \\ & & -6 & 9 & -15 & \\ \hline & 2 & -3 & 5 & 0 & \end{array}$$

$2x^2 - 3x + 5$

4D) $(6b^4 - 8b^3 + 12b - 14) \div (b - 2)$

$$\begin{array}{r|rrrrr} 2 & 6 & -8 & 0 & 12 & -14 & \\ & & 12 & 8 & 16 & 56 & \\ \hline & 6 & 4 & 8 & 28 & 42 & \end{array}$$

Ex #5: $(\frac{3}{3}x^4 - \frac{5}{3}x^3 + \frac{1}{3}x^2 + \frac{7}{3}x) \div (\frac{1}{3}x + \frac{1}{3})$

$$\begin{array}{r|rrrrr} -\frac{1}{3} & 1 & -\frac{5}{3} & \frac{1}{3} & \frac{7}{3} & 0 & \\ & & -\frac{1}{3} & \frac{2}{3} & -\frac{1}{3} & -\frac{2}{3} & \\ \hline & 1 & -2 & 1 & 2 & -\frac{2}{3} & \end{array}$$

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

$$\frac{\frac{2}{3}}{x + \frac{1}{3}} = \frac{2}{3} \div (x + \frac{1}{3})$$

$$\frac{3x + \frac{5}{3}}{3} + \frac{1}{3}$$

$$\frac{2}{3} \div \frac{3x + 1}{3}$$

$$\frac{2}{3} \div \frac{3x + 1}{3} = \frac{2}{3x + 1}$$

$x^3 - 2x^2 + x + 2 - \frac{2}{3x+1}$ A.E.C.

$$\begin{array}{r} 3x+1 \overline{) 3x^4 - 5x^3 + x^2 + 7x + 0} \\ \underline{-3x^4 + x^3} \\ -4x^3 + x^2 + 7x + 0 \\ \underline{+ 4x^3 + 2x^2} \\ 3x^2 + 7x + 0 \\ \underline{-3x^2 + 1x} \\ 6x + 10 \\ \underline{-6x + 2} \\ -2 \end{array}$$

$$\begin{array}{r} 2 \overline{) 6 - 2} \\ \underline{3x+1} \\ 6^2 \\ \underline{3x+1} \\ 3 \end{array}$$

$$\frac{6}{3x+1} + \frac{6}{3}$$

$$\frac{2}{3x+1}$$