

LT #4: Polynomial Division

1.

- a. Use synthetic division to find $(x^3 - 3x - 2) \div (x + 1)$. (3 points)
(Be careful!)

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

- b. Is $x+1$ a factor? Explain your reasoning. (2 points)

2. Divide using long division $(x^3 + 2x^2 - 5x - 6) \div (x + 4)$. Write your answer as a quotient statement. (4 points)

$$\begin{array}{r} x^2 - 2x + 3 \\ x+4 \overline{) x^3 + 2x^2 - 5x - 6} \\ \underline{-(x^3 + 4x^2)} \downarrow \\ -2x^2 - 5x \\ \underline{-(-2x^2 + 8x)} \\ 3x - 6 \\ \underline{-(3x + 12)} \\ -18 \end{array}$$

$$(x^3 + 2x^2 - 5x - 6) \div (x + 4) = x^2 - 2x + 3 - \frac{18}{x+4}$$

3. Determine if $x - 3$ is a factor of $x^3 - 3x^2 + 2x - 4$ using either substitution or synthetic division. You must show work! (2 pts)

$$\begin{array}{r|rrrr} 3 & 1 & -3 & 2 & -4 \\ & & 3 & 0 & 6 \\ \hline & 1 & 0 & 2 & 2 \end{array} \quad \left. \begin{array}{l} \text{OR} \\ (3)^3 - 3(3)^2 + 2(3) - 4 \\ 27 - 27 + 6 - 4 \\ 2 \end{array} \right\} \textcircled{2}$$

1.
a. $x^2 - x - 2$
b. Yes because the remainder is 0

2.
See answer at left

3.
YES or NO