

## ***DIVIDING POLYNOMIALS***

DONE BY THE PROCESS KNOWN AS

Long Division

$$x+2 \overline{)x^2+2x+4}$$

SIMILAR TO OLD - SCHOOL DIVISION

$$\begin{array}{r} 16 \\ 4 \overline{)64} \\ \underline{4} \\ 24 \end{array}$$

EXAMPLES:

1.  $(x^3 + 2x^2 + 2x) \div x$

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

$$\boxed{x^2 + 2x + 2} \quad \begin{array}{r} 2x \\ -2x \\ \hline 0 \end{array}$$

2.  $(2x^6 + x^5 + 2x^4) \div x$

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

$$\boxed{2x^5 + x^4 + 2x^3}$$

## EXAMPLES:

3.  $(n^2 - 5n + 6) \div (n - 2)$

$$\begin{array}{r} n-2 \overline{) n^2 - 5n + 6} \\ \underline{-n^2 - 2n} \phantom{+ 6} \\ -3n + 6 \\ \underline{-(-3n + 6)} \\ 0 \end{array}$$

$n-3$

$n-3$

## EXAMPLES:

4.  $(3n^2 + 6n - 9) \div (n + 3)$   $3n - 3$

$$\begin{array}{r}
 n + 3 \overline{) 3n^2 + 6n - 9} \\
 \underline{3n^2 + 9n} \phantom{- 9} \\
 -3n - 9 \\
 \underline{-3n - 9} \\
 0
 \end{array}$$

REMAINDERS

$$\begin{array}{r}
 21r^2 \\
 4 \overline{) 86} \\
 \underline{-8} \\
 6 \\
 \underline{-4} \\
 2
 \end{array}$$

$21\frac{2}{4}$  or  $21r^2$   
 $21\frac{1}{2}$

LOOK FOR remainders WHEN DIVIDING POLYNOMIALS.

WRITE REMAINDERS AS rational expression  
(fraction)

**EXAMPLE:**

5.  $(x^2 - 4x + 6) \div (x - 2)$

$x - 2$

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

$$\begin{array}{r} x-2 \overline{) x^2 - 4x + 6} \\ \underline{-x^2 + 2x} \phantom{+ 6} \\ -2x + 6 \\ \underline{-(-2x + 4)} \\ 2 \end{array}$$