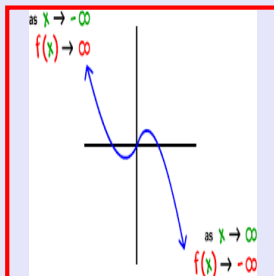
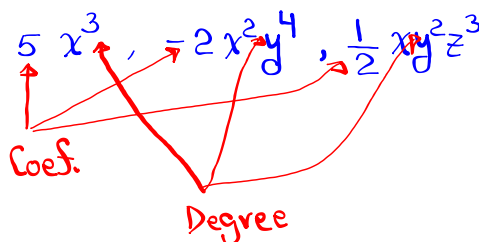


Math 245
Spring 2022
Lecture 28



Monomial \Rightarrow Number \cdot Variables whole Number



$5x^3 \Rightarrow$ Coef. = 5, Degree = 3

$-2x^2y^4 \Rightarrow$ Coef. = -2, Degree = 2 + 4 = 6

$\frac{1}{2}xyz^3 \Rightarrow$ Coef. = $\frac{1}{2}$, Degree = 1 + 2 + 3 = 6

Constant is a monomial with just a number and no variable. Degree of constant is Zero

$-\frac{3}{5}, 2022, 1, -1$

How to divide Monomial by another Monomial:

$$\frac{15x^6y^8}{-3x^2y^7} = \frac{15}{-3} \cdot \frac{x^6}{x^2} \cdot \frac{y^8}{y^7}$$

$$= -5x^{6-2}y^{8-7}$$

$$= -5x^4y^1 = \boxed{-5x^4y}$$

Coef. = -5

Deg. = 4+1 = 5

If $x \neq 0, x^0 = 1$

Divide: $\frac{-18x^7y^6z^4}{-3x^2yz^4}$

$$= \frac{-18}{-3} \cdot \frac{x^7}{x^2} \cdot \frac{y^6}{y} \cdot \frac{z^4}{z^4}$$

$$= 6 \cdot x^{7-2} \cdot y^{6-1} \cdot z^{4-4} = 6x^5y^5z^0 = \boxed{6x^5y^5}$$

Coef. = 6

Deg. = 10

$$\boxed{6x^5y^5}$$

Poly nomials: When you add or subtract monomials.

$$4x^3 + 7x^2 - 10x + 15$$

Deg. = 3
Lead. Coef. = 4
Constant = 15

$$\frac{-2x^4y^5}{\text{Deg.} = 9, \text{Coef.} = -2} + \frac{10x^3y^2}{\text{Deg.} = 5, \text{Coef.} = 10} - \frac{100xy}{\text{Deg.} = 2, \text{Coef.} = -100} - 2022$$

Constant = 2022
Deg. = 0

Deg. = 9
L.C. = -2

Dividing Polynomials by monomials:

$$\frac{8x^4 - 6x^2 + 8}{4x^2} = \frac{8x^4}{4x^2} - \frac{6x^2}{4x^2} + \frac{8}{4x^2}$$

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

Divide:

$$12x^6y^8 - 9x^4y^6 + 3x^3y^2$$

$$\frac{12x^6y^8}{-3x^3y^2} - \frac{9x^4y^6}{-3x^3y^2} + \frac{3x^3y^2}{-3x^3y^2}$$

$$= -4x^{6-3}y^{8-2} + 3x^{4-3}y^{6-2} - 1 = -4x^3y^6 + 3xy^4 - 1$$

Deg. = 3+6=9

L.C. = -4

Const. = -1

Polynomial
Polynomial

Long Division

$$\frac{x^3 + 5x^2 - 3x - 3}{x - 1}$$

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

$$x \boxed{x^2} = x^3$$

$$x \boxed{6x} = 6x^2$$

$$x \boxed{3} = 3x$$

Final Ans:
 $x^2 + 6x + 3$

Remainder $\rightarrow 0$

Divide $\frac{4x^3 - 5x^2 + 3x - 8}{x+2}$

$x \overline{) 4x^2} = 4x^3$

$x \overline{) -13x} = -13x^2$

$x \overline{) 29} = 29x$

$$\begin{array}{r}
 \overline{) 4x^3 - 5x^2 + 3x - 8} \\
 \underline{-(4x^3 + 8x^2)} \\
 -13x^2 + 3x - 8 \\
 \underline{-(-13x^2 - 26x)} \\
 29x - 8 \\
 \underline{-(29x + 58)} \\
 -66
 \end{array}$$

Final Ans: $4x^2 - 13x + 29 + \frac{-66}{x+2}$ Remainder $\rightarrow -66$

Divide: $\frac{x^2 - 20}{x-4} \neq \frac{x^2}{x} + \frac{20}{4}$ **WRONG**

$x \overline{) x} = x^2$

$x \overline{) 4} = 4x$

$$\begin{array}{r}
 \overline{) x^2 + 0x - 20} \\
 \underline{-(x^2 - 4x)} \\
 4x - 20 \\
 \underline{-(4x - 16)} \\
 -4
 \end{array}$$

Remainder $\rightarrow -4$

Final Ans $x + 4 + \frac{-4}{x-4}$

Divide: $\frac{x^3 + 32}{x + 2}$

$$x \boxed{x^2} = x^3$$

$$x \boxed{-2x} = -2x^2$$

$$x \boxed{4} = 4x$$

$$\begin{array}{r}
 x^2 - 2x + 4 \\
 x+2 \overline{) x^3 + 0x^2 + 0x + 32} \\
 \underline{-(x^3 + 2x^2)} \\
 -2x^2 + 0x + 32 \\
 \underline{-(-2x^2 - 4x)} \\
 4x + 32 \\
 \underline{-(4x + 8)} \\
 \text{Remainder} \quad \rightarrow 24
 \end{array}$$

$$x^2 - 2x + 4 + \frac{24}{x+2}$$