

Activity 19 Notes.

1) $1(18x^4 - 2x^3 - 7x + 8) - 1(9x^4 - 4x^2 + 7x)$

$\boxed{18x^4} - \boxed{2x^3} - \cancel{7x} + \underline{8} - \boxed{9x^4} + \boxed{4x^2} - \cancel{7x}$

$\downarrow$

$\boxed{9x^4 - 2x^3 + 4x^2 - 14x + 8}$

2) $(7x^3 - 15x - 4) + (5x^3 - 15x + 3x)$

$\boxed{7x^3} - \boxed{15x} - \underline{4} + \boxed{5x^3} - \boxed{15x} + \boxed{3x}$

$\boxed{12x^3 - 27x - 4}$

3) $(3x^2 + 2x - 3)(x + 3)$

	x	$+3$
$3x^2$	$3x^3$	$9x^2$
$+2x$	$2x^2$	$6x$
-3	$-3x$	-9

$3x^3 + 11x^2 + 3x - 9$

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$$2x^2 - 3x - 4$$

4)

x^2	$2x^4$	$-3x^3$	$-4x^2$
$-x$	$-2x^3$	$3x^2$	$4x$
$+1$	$2x^2$	$-3x$	-4

$$2x^4 - 5x^3 + x^2 + x - 4$$

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5)

$$y^2 - y + 1 \overline{) y^4 + 2y^2 - y + 5}$$

↓
make sure the exponents are descending
 $y^4 + y^3 + y^2 \dots$

$$y^2 - y + 1$$

$$\begin{array}{r} y^2 + y + 2 \\ y^4 + 0y^3 + 2y^2 - y + 5 \\ - (y^4 - y^3 + y^2) \\ \hline y^3 + y^2 - y \\ - (y^3 - y^2 + y) \\ \hline 2y^2 - 2y + 5 \\ 2y^2 - 2y + 2 \\ \hline 3 \end{array}$$

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

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6)

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

$$\begin{array}{r} x^2 - 3x + 4 \\ x+2 \overline{) x^3 - x^2 - 2x + 8} \\ \underline{-x^3 + 2x^2} \downarrow \\ -3x^2 - 2x \downarrow \\ \underline{-3x^2 - 6x} \downarrow \\ 4x + 8 \\ \underline{4x + 8} \\ 0 \end{array}$$

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7)

Synthetic Division
may be used when $\div (x-k)$

$$(3y^3 - 2y^2 - y - 1) \div (y - 2)$$

1) place k
↓

2) List the coefficients in order of
descending degree terms

2		3		-2		-1		-1
		↓	↗	↓	↗	↓	↗	↓
+		x		6		8		14
			↓	↓	↓	↓	↓	↓
			3	4	7			+13

3) bring down the 1st coefficient

$$3y^2 + 4y + 7 + \frac{13}{y-2}$$

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8)

$$\frac{2x^3 + 8x^2 + 7}{x+4} \xrightarrow{\text{in order}} 2x^3 + 8x^2 + 0x + 7$$

$$\Rightarrow x - k$$

$$\begin{array}{r|rrrr} -4 & 2 & 8 & 0 & 7 \\ & \downarrow & \downarrow & \downarrow & \downarrow \\ + & 2 & -8 & 0 & 0 \end{array}$$

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



$$2x^2 + 0x + 0 + \frac{7}{x+4}$$

$$= \boxed{2x^2 + \frac{7}{x+4}}$$

11) $10x^4 + 5x^3 + 4x^2 + 0x - 9$

$x+1 \Rightarrow k=-1$

$$\begin{array}{r|rrrrrr}
 -1 & 10 & 5 & 4 & 0 & -9 \\
 & \downarrow & \nearrow & \downarrow & \nearrow & \downarrow & \nearrow \\
 +1 & & 10 & -5 & 9 & -9 & 0
 \end{array}$$

$10x^3 - 5x^2 + 9x - 9$