Steps when doing long division:

1. Gozinto — 12 goes into 54 four times
2. Multipy — multiple 4 by the divisor
3. Subtract
4. Bring Down — bring down the next number

$$\begin{array}{r} 4 \\ 12\overline{)\,54376} \\ -\,48 \\ \hline 63 \end{array}$$

Keep repeating these steps until done.

Find this quotient. $\dfrac{5x^3 - 9x^2 + 2x - 11}{x - 4}$

x times ? equals $5x^3$

Deciding on each part of the quotient is a lot like when we used the box to factor.

4x times ? equals $8x^2$

4x	$8x^2$	+12x
	-14x	-21

$$\begin{array}{r} 5x^2 + 11x + 46 \\ x-4\overline{)\,5x^3 - 9x^2 + 2x - 11} \\ -\,5x^3 - 20x^2 \\ \hline 11x^2 + 2x \\ -\,11x^2 - 44x \\ \hline 46x - 11 \\ -\,46x - 184 \\ \hline 173 \end{array}$$

$\dfrac{5x^3 - 9x^2 + 2x - 11}{x - 4} = 5x^2 + 11x + 46 \quad R=173$

Find this quotient. $\dfrac{-8x^3 + x^2 - 3x - 1}{x + 2}$

$$\begin{array}{r} -8x^2 + 17x - 37 \\ x+2\overline{)\,-8x^3 + x^2 - 3x - 1} \\ -\,-8x^3 - 16x^2 \\ \hline 17x^2 - 3x \\ -\,17x^2 + 34x \\ \hline -37x - 1 \\ -\,-37x - 74 \\ \hline 73 \end{array}$$

$\dfrac{-8x^3 + x^2 - 3x - 1}{x + 2} = -8x^2 + 17x - 37 \quad R=73$

Find this quotient. $\dfrac{4x^3 + 2x^2 - 15x - 17}{x - 9}$

$$\begin{array}{r} 4x^2 + 38x + 327 \\ x-9\overline{)\,4x^3 + 2x^2 - 15x - 17} \\ -\,4x^3 - 36x^2 \\ \hline 38x^2 - 15x \\ -\,38x^2 - 342x \\ \hline 327x - 17 \\ -\,327x - 2943 \\ \hline 2926 \end{array}$$

$\dfrac{4x^3 + 2x^2 - 15x - 17}{x - 9} = 4x^2 + 38x + 327 \quad R=2926$

Find this quotient. $\dfrac{2x^3+x^2-19x+10}{2x-5}$

$$2x-5 \;\overline{)\; 2x^3+x^2-19x+10}$$

x^2+3x-2

$-(2x^3-5x^2)$

$6x^2-19x$

$-(6x^2-15x)$

$-4x+10$

$-(-4x+10)$

0

$$\frac{2x^3+x^2-19x+10}{2x-5} = x^2+3x-2 \quad R=0$$

Find this quotient. $\dfrac{2x^3-7x+8}{x-3}$

$$x-3 \;\overline{)\; 2x^3-7x+8}$$

$2x^2$

$-(2x^3-6x^2)$

$\Longrightarrow$

$$x-3 \;\overline{)\; 2x^3+0x^2-7x+8}$$

$2x^2+6x+11$

$2x^3-6x^2$

$+6x^2-7x$

$-(+6x^2-18x)$

$11x+8$

$-(11x-33)$

41

notice these are not like terms so you can't subtract them. This happens because there is a missing term in the dividend. To avoid this you can write the divident with a zero in place of the missing term.

$$\frac{2x^3-7x+8}{x-3} = 2x^2+6x+11 \quad R=41$$

Find this quotient. $\dfrac{8x^3-6x^2+24x-23}{4x-3}$

$$4x-3 \;\overline{)\; 8x^3-6x^2+24x-23}$$

$2x^2+6$

$-(8x^3-6x^2)$

0

$+24x-23$

$-(+24x-18)$

-5

When you subtracted both terms cancelled so you must bring down the next 2 terms. The number of terms after subtracting and bringing down must match the number of terms in the divisor.

Find this quotient. $\dfrac{6x^4+20x^3-17x^2+66x-24}{3x^2-2x+7}$

$$3x^2-2x+7 \;\overline{)\; 6x^4+20x^3-17x^2+66x-24}$$

$2x^2+8x-5$

$6x^4-4x^3+14x^2$

$24x^3-31x^2+66x$

$-(24x^3-16x^2+56x)$

$-15x^2+10x-2x$

$-(-15x^2+10x-35)$

11

$$\frac{6x^4+20x^3-17x^2+66x-24}{3x^2-2x+7} = 2x^2+8x-5 \quad R=11$$