Synthetic Division—shortcut to long division—only use if dividing by

$(x-a)$ --where ***a*** is a constant

Linear

$(5x^3-13x^2+10x-8)\div(x-2)$

$x-2=0$

$x=2$

① Standard form and check for missing terms.

2	5	-13	10	-8
		10	-6	8
	$5x^2$	-3	4	10

↑ Remainder

② Solve the divisor for x. Write the answer inside the partial box.

③ Write the coefficients & the constant horizontally next to the partial box.

④ Bring down the 1st coefficient

⑤ Multiply the # in the partial box by the # under the line. Write the answer above the line in the next column

⑥ add the column and Repeat steps 5-6 until the end.

⑦ Write the answer beginning with a degree that is one less than the dividend.

$5x^2-3x+4$

More synthetic Division

- Remember if you are missing a term, you need to put in a zero for the coefficient

$$\left(z^5 - 3z^2 - 88\right) \div \left(z + 2\right)$$

$$\begin{array}{r|cccccc} -2 & 1 & 0 & 0 & -3 & 0 & -88 \\ & \downarrow & -2 & 4 & -8 & 22 & -44 \\ \hline & 1 & -2 & 4 & -11 & 22 & -132 \end{array}$$

$$x^4 - 2x^3 + 4x^2 - 11x + 22 - \frac{132}{x+2}$$

More synthetic Division

$$(4x^4 - 17x^2 + 14x - 3) \div (2x - 3)$$

$\frac{3}{2}$

	4	0	-17	14	-3
↓		6	9	-12	3
	4	6	-8	2	0

÷2 ÷2 ÷2 ÷2

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

$2x - 3 = 0$
$2x = 3$
$x = \frac{3}{2}$

Divide the coeff by the denom.