SYNTHETIC DIVISION HOW-TO

Here is a division process: $(2x^3 - x^2 + 2x - 3) \div (x - 1)$

Standard division: Synthetic division:

$$\begin{array}{r} 2x^2 + x + 3 \\ x - 1 \enclose{longdiv}{2x^3 - x^2 + 2x - 3} \\ \underline{2x^3 - 2x^2} \\ x^2 \\ \underline{x^2 - x} \\ 3x - 3 \\ \underline{3x - 3} \\ 0 \end{array}$$

```
1 |  2    -1     2    -3
   |        2     1     3
   ------------------------
      2     1     3     0
```

Below we are step by step instructions.

Bring down the first coefficient.
(Or Add: 2 plus nothing = 2)

```
1 |  2    -1     2    -3
   |
   ------------------------
      2
```

Multiply this by c which is 1 here:
         1 · 2 = 2

```
1 |  2    -1     2    -3
   |        2
   ------------------------
      2
```

ADD: -1 + 2 = 1

```
1 |  2    -1     2    -3
   |        2
   ------------------------
      2     1
```

Repeat: Multiply the 1 by c   (c=1 here)
         1 · 1 = 1

```
1 |  2    -1     2    -3
   |        2     1
   ------------------------
      2     1
```

and ADD: 2 + 1 = 3

```
1 |  2    -1     2    -3
   |        2     1
   ------------------------
      2     1     3
```

Repeat: Multiply the 3 by c   (c=1 here)
         1 · 3 = 3

```
1 |  2    -1     2    -3
   |        2     1     3
   ------------------------
      2     1     3
```

and ADD: -3 + 3 = 0

```
1 |  2    -1     2    -3
   |        2     1     3
   ------------------------
      2     1     3
```

...from which we read the answer: Quotient is $2x^2 + 1x + 3$ Rem = 0

A side-by-side comparison can be seen at Purplemath.com

There are a number of synthetic divisions in problem #4a of the chapter 5 preview ,
also posted on the Notices page.