Möbius Strips and More

(1) Möbius strip -- only one side!

(2) Cut it in half, get ... something.

(3) Take a long, thin strip, give it two twists and tape it.

(4) Is this the same as the Möbius strip/2? [Reconfigure the M.S/2 to look like a figure-eight also.]
(discuss)

(5) Put each in "box form," see the difference.

(6) How to prove it?
One way to show that two things are different is to do the same thing to each one and see if you get the same result. [An <u>invariant</u>]

(7) Cut each in half -- two interlocked loops.
Crumple each one: They are interlocked differently!

(8) The M.S. only has one side; its surface is connected.
[Distinguish a <u>shape</u> vs its <u>surface</u>]
What is the shape of its surface?

(9) Take two strips on top of each other, and make a "doubled-over" Möbius strip. Then, tape it. Now, the paper is in the shape of the surface!

(10) Fold it into box form ... same thing!

So, this "flat form" or "box form" is useful...

(11) To get something else with one side, we need 3 twists (two won't work).

What is the shape of that "side?"

For one thing, it's knotted!

Connecting a couple of these ideas with math you've already seen... (next)

After 15:

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

$$x^2 - 6x + 9 + Ax + B$$

$$x^2 + [A-6]x + [B+9]$$

$$\quad\;\; 9 \qquad\qquad\quad -7$$

$$x^2 + 3x + 2$$

$$(x+2)(x+1)$$

Are

$(x-3)^2 + 9x - 7$ and $(x+2)(x+2) - x - 2$

the same?

(Have them do it)

How did you solve it? With a "standard form."

There is ~~another~~ "standard form" for a polynomial, which is good for giving you graphical information.

- What is it?
- $a(x-b)^2 + c$