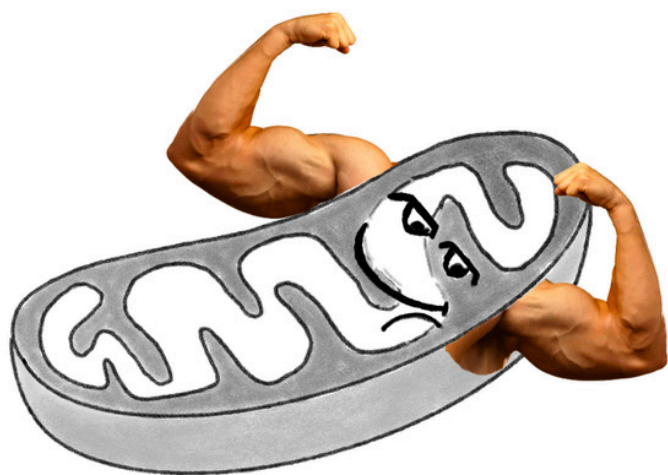
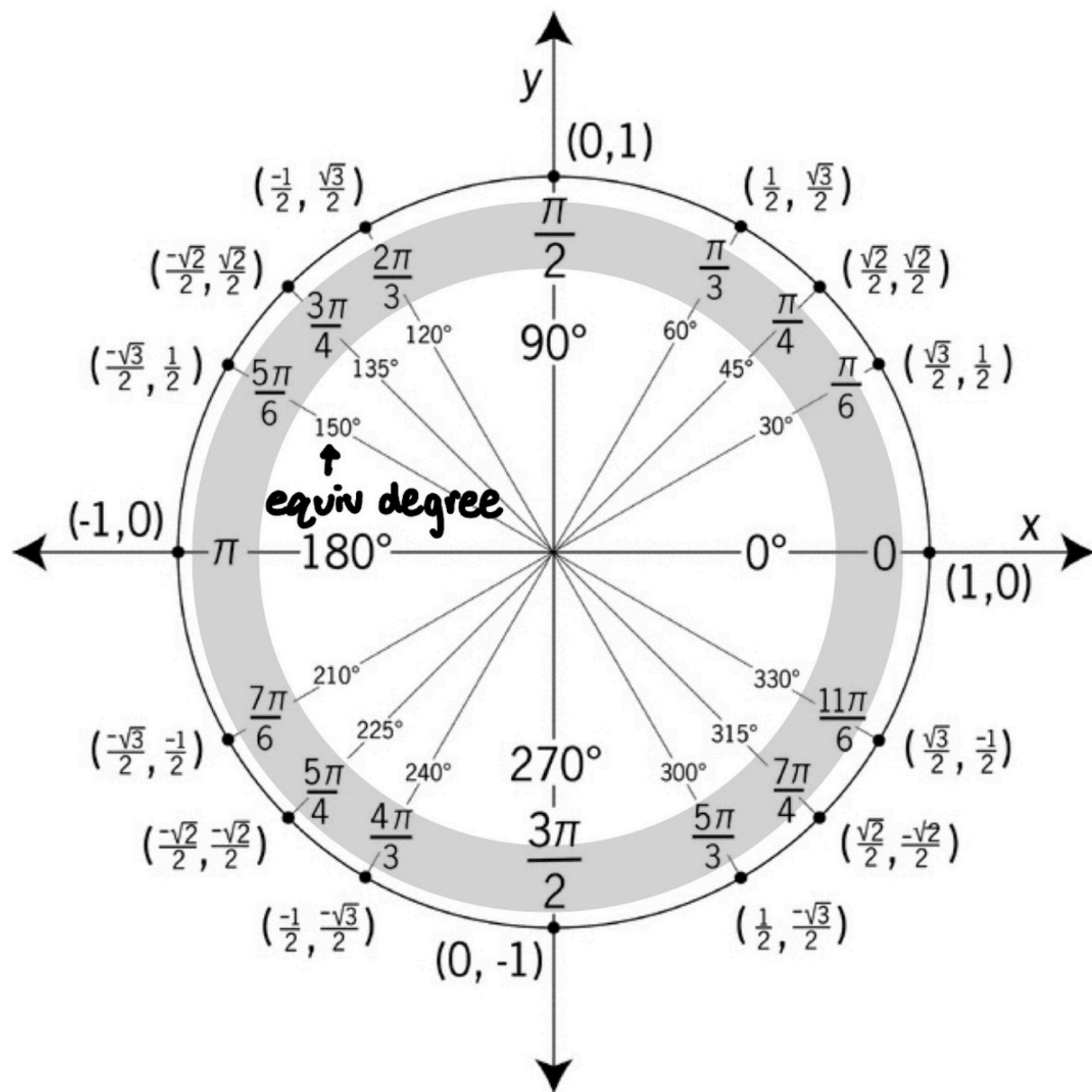


PRE-CALC

UNIT CIRCLE





 = angle in radians

SIGNS:

Sin is
positive

All are
positive

Tan is
positive

Cos is
positive

REMEMBER:

Sin = y value Cos = x value

$$\tan = \frac{y}{x} = \text{slope}$$

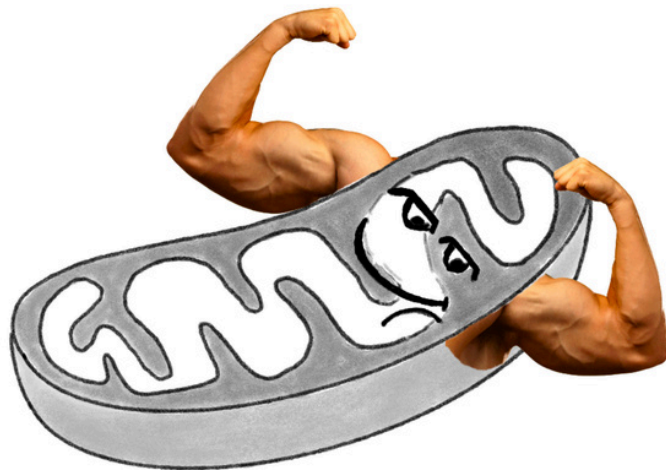
eg: @ $\frac{\pi}{6}$ on unit circle, points
are $(\frac{\sqrt{3}}{2}, \frac{1}{2}) \rightarrow \sin \frac{\pi}{6} = \frac{1}{2}$,

$$\cos \frac{\pi}{6} = \frac{\sqrt{3}}{2}, \quad \tan \frac{\pi}{6} = \frac{1}{2} \div \frac{\sqrt{3}}{2} = \frac{1}{\sqrt{3}}$$

PRE-CALC

GRAPHING POLYNOMIALS

GUIDE



1. DEGREE

→ degree = highest exponent

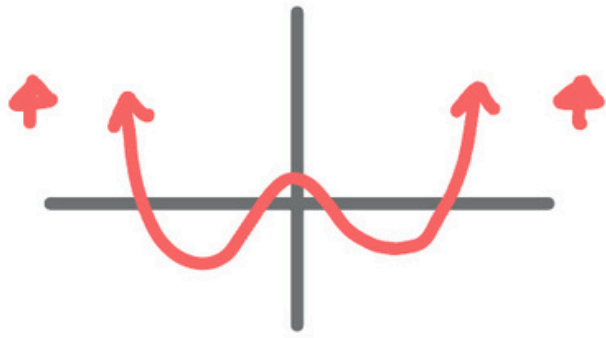
even degree: both ends point
in the SAME direction

odd degree: both ends point
in DIFFERENT directions

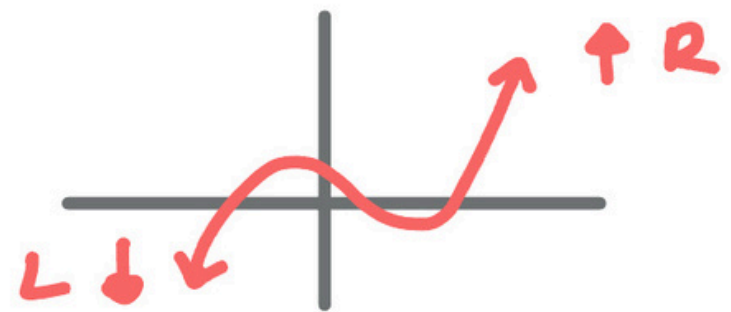
2. LEADING COEFFICIENT

→ determines end behaviour

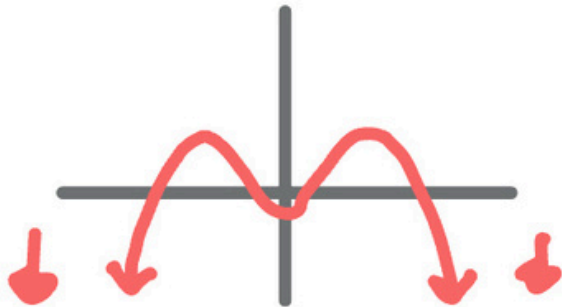
positive LC + even degree



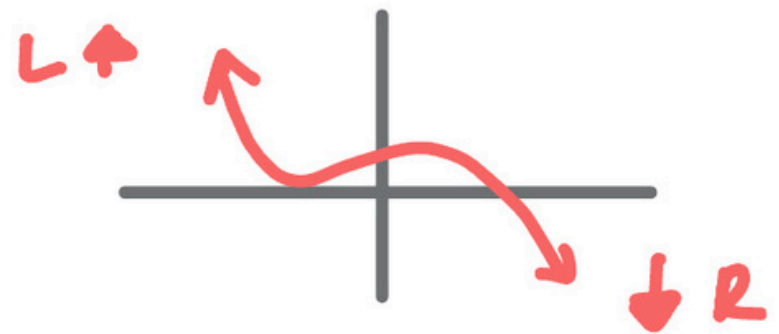
positive LC + odd degree



negative LC + odd degree



negative LC + odd degree

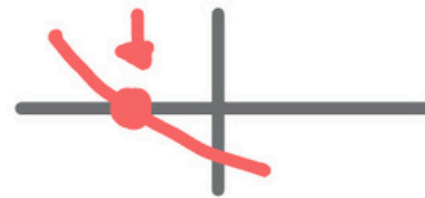


3. X-INT & MULTIPLICITY

→ multiplicity: how many times a zero (x-int) repeats

eg. $(x-2)^2 \rightarrow$ multiplicity of 2

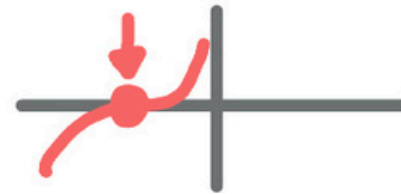
multiplicity of 1: graph
CROSSES THROUGH x-int



multiplicity of 2: graph
TOUCHES & BOUNCES BACK



multiplicity of 3: graph
crosses but **FLATTENS**



4. Y-INT & CONNECTING

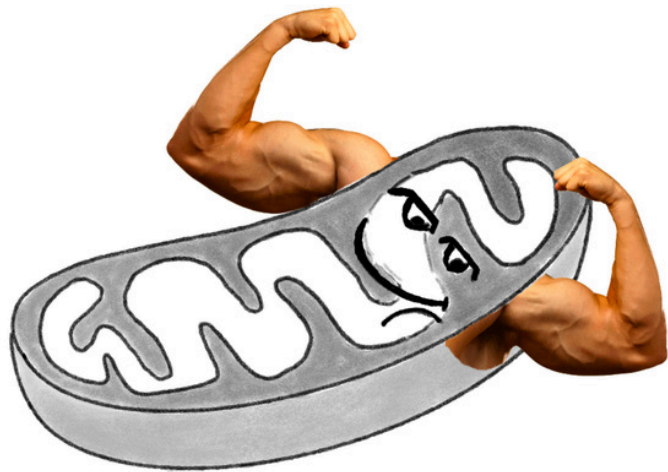
→ plug in $x=0$ to find the y-int

→ plot all points & connect with a smooth curve, remember end behaviour

→ no sharp corners or breaks

PRE-CALC

RATIONAL ROOT THEOREM REVIEW



What does rational root theorem say?

For a polynomial w/ **integer coefficients**, any rational root must be in the form $\frac{p}{q}$

p : factor of constant term

q : factor of leading coefficient (LC)

FINDING P & Q

eg:

LC

constant

$$2x^3 - 3x^2 - 8x + 12$$



factors: $\pm 1, \pm 2$
(q)

factors: $\pm 1, \pm 2,$
 $\pm 3, \pm 4, \pm 6, \pm 12$ (p)

→ certain combinations of $\frac{p}{q}$
will be the root

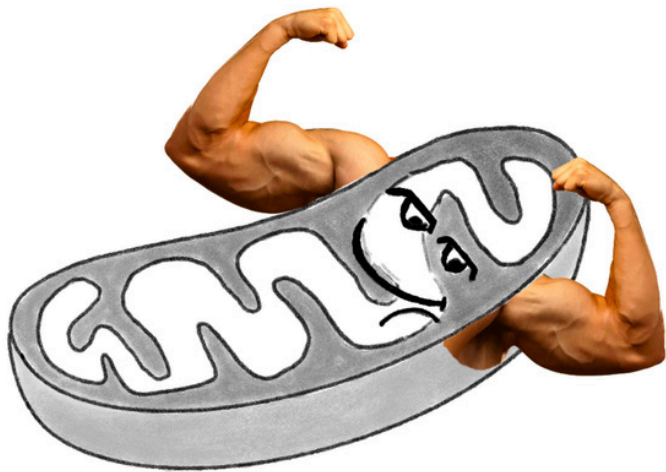
FINDING ROOTS

→ rational root theorem
can be used to find a root
to be used for **synthetic division**

TIP: when testing combinations
of $\frac{p}{q}$ for a root, always start
from **$q = \pm 1$**

PRE-CALC

POLYNOMIAL DIVISION – SYNTHETIC GUIDE



1. SETTING IT UP

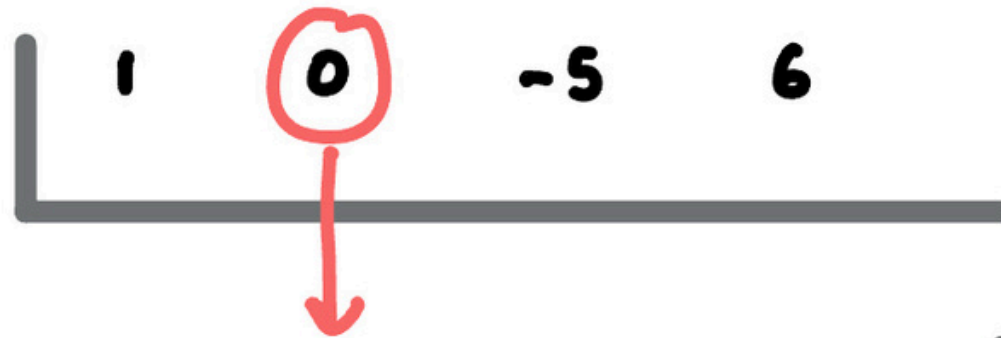
Remember: this method only works when dividing by factor in form $(x-c)$

eg. divide $x^3 - 5x + 6$ by $(x - 2)$

→ set up long L shape



→ convert $x^3 - 5x + 6$ to coefficient form
from **highest to lowest degree** in L shape

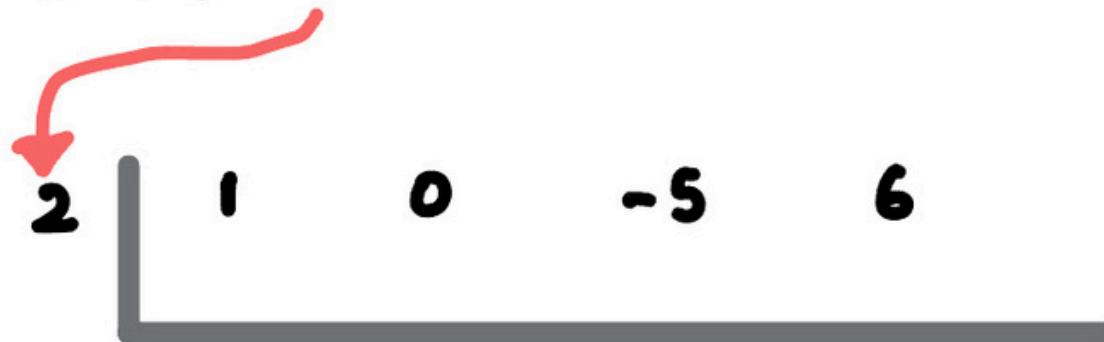


for missing degrees, (x^2 here)
use 0 as placeholder

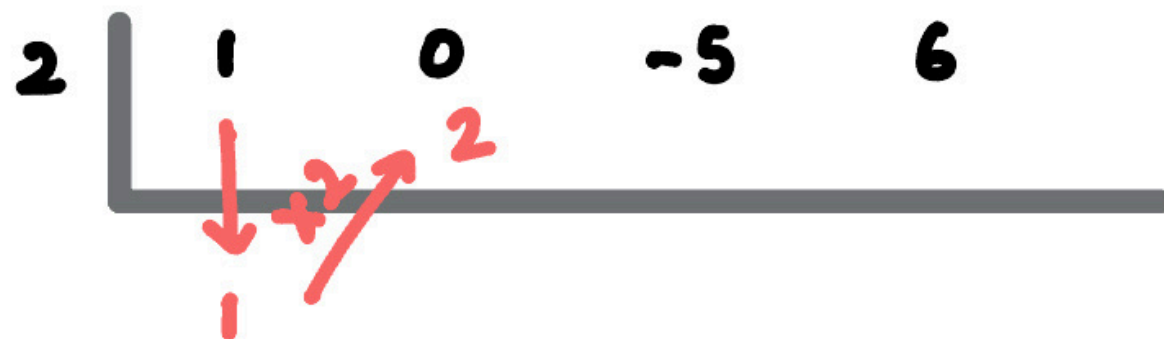
→ set $(x - c) = 0$, & find value of x

→ place that value to the left of L shape

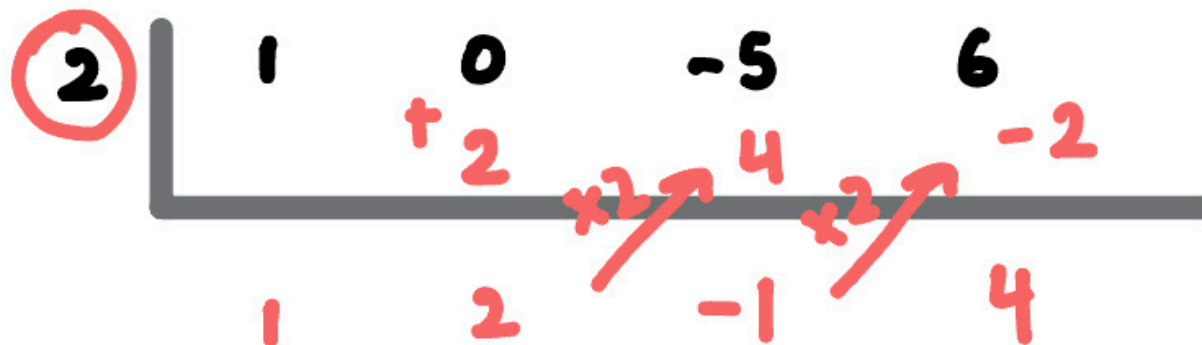
$$x - 2 = 0, x = 2$$



→ drop 1st coeff down, multiply by x value & move new value under next coeff



→ add columns straight down, & repeat this process across



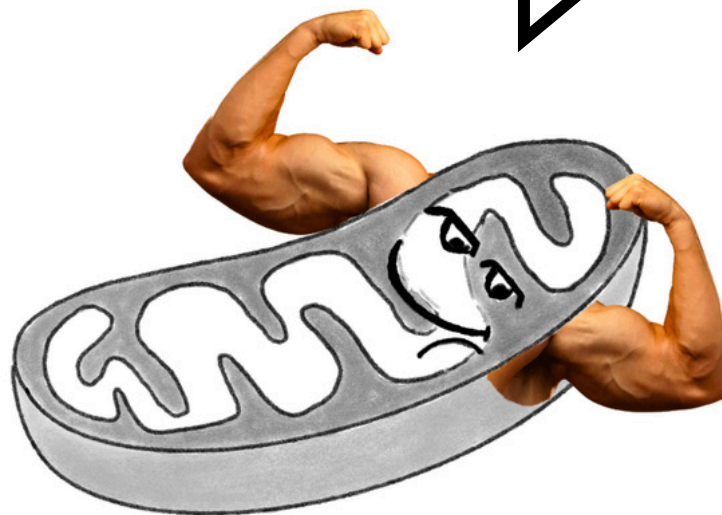
→ bottom row = coefficients of answer,
ONE DEGREE LOWER

→ value below last coeff = **remainder**

$$\begin{array}{r|rrrr} 2 & 1 & 0 & -5 & 6 \\ & & 2 & 4 & -2 \\ \hline & 1 & 2 & -1 & 4 \end{array}$$

answer: $x^2 - 2x - 1$, $R=4$

**follow for
more!**



@mightochondria 
@mightochondria.stem

