The Eleven Commandments
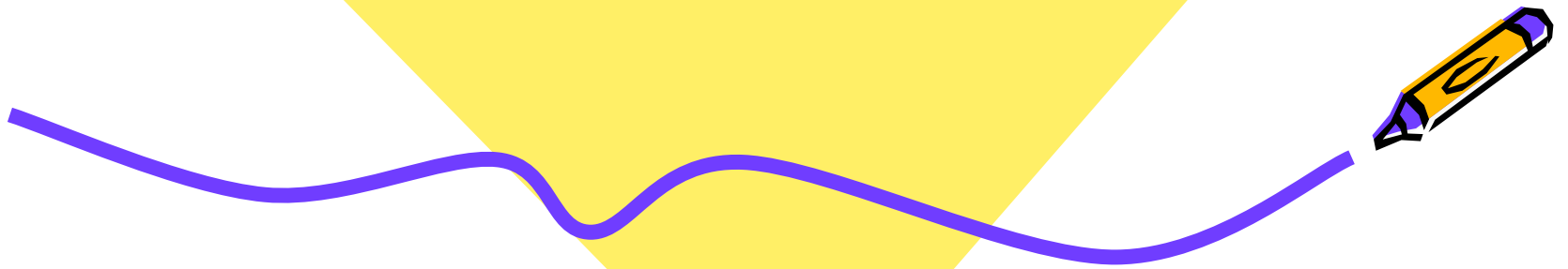
Colleen Young
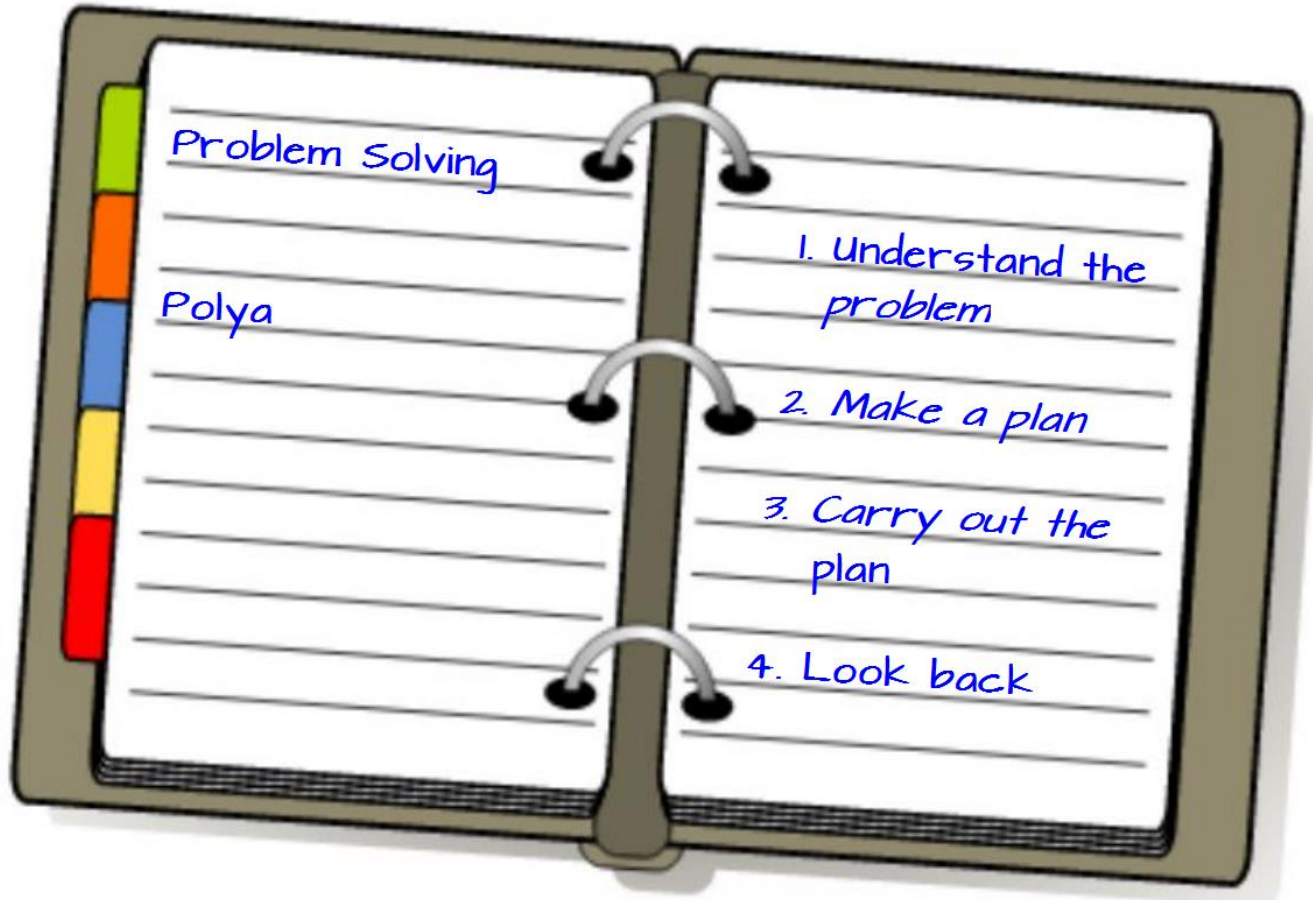
The Eleven Commandments

for mathematicians
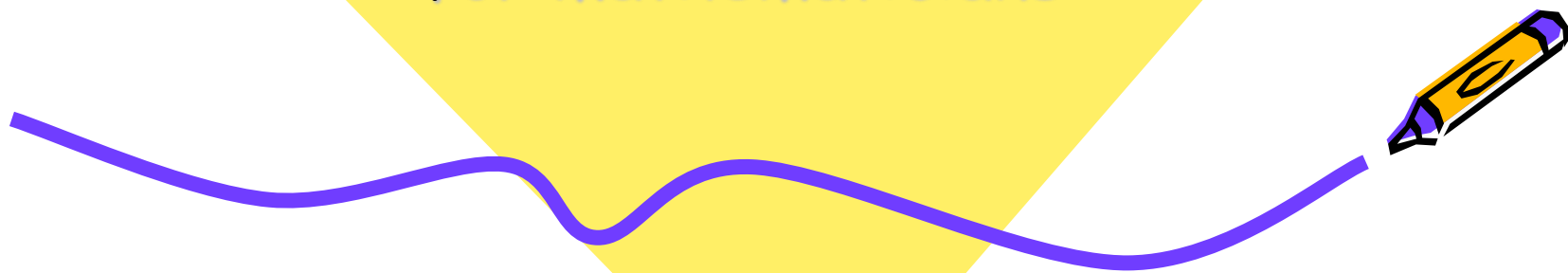
Thou shalt read thy problem carefully.

Problem Solving

Polya

1. Understand the problem

2. Make a plan

3. Carry out the plan

4. Look back

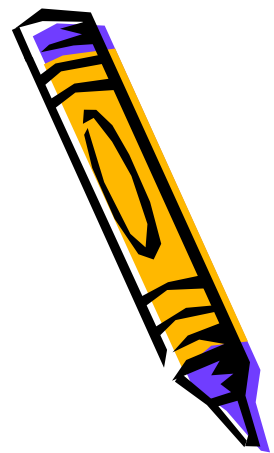1 Read and understand the problem

How are your problem solving skills?

See this document from The University of California, Berkeley for a succinct guide to Polya's problem solving strategy

For a more detailed guide with examples try this publication from Arizona State University.

2

Whatsoever thou doest to one side of thy equation, do ye also to the other.
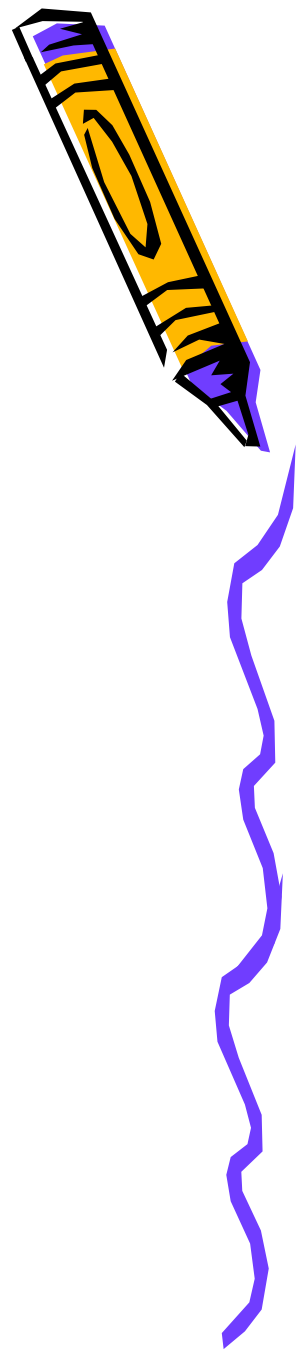
2 How's your Algebra?

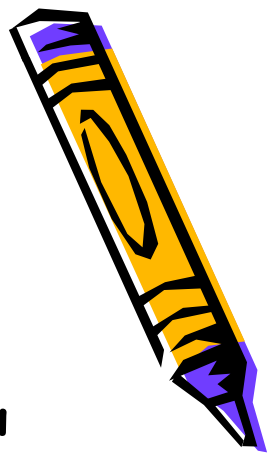There are plenty of resources online to help.
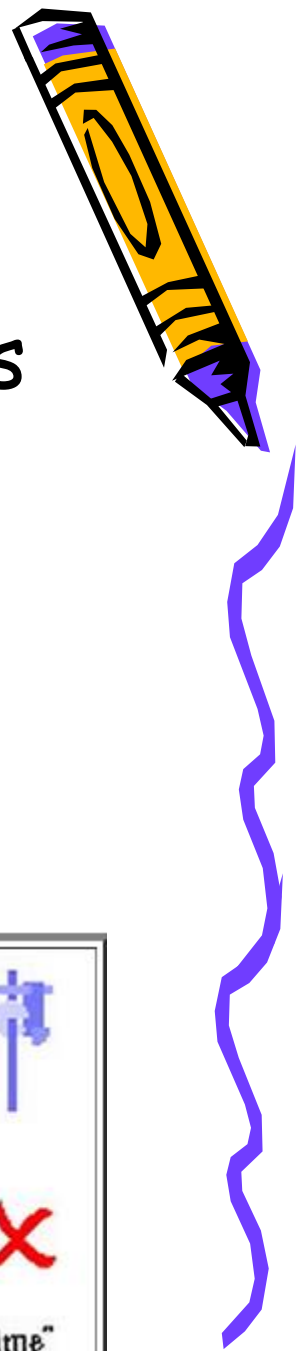
Notes   Videos   Reference

3

Thou must use thy "common sense", else thou wilt have flagpoles 9,000 feet high. Yea, even fathers younger than sons.

3 Always check your work

Are you checking that your answer is sensible?
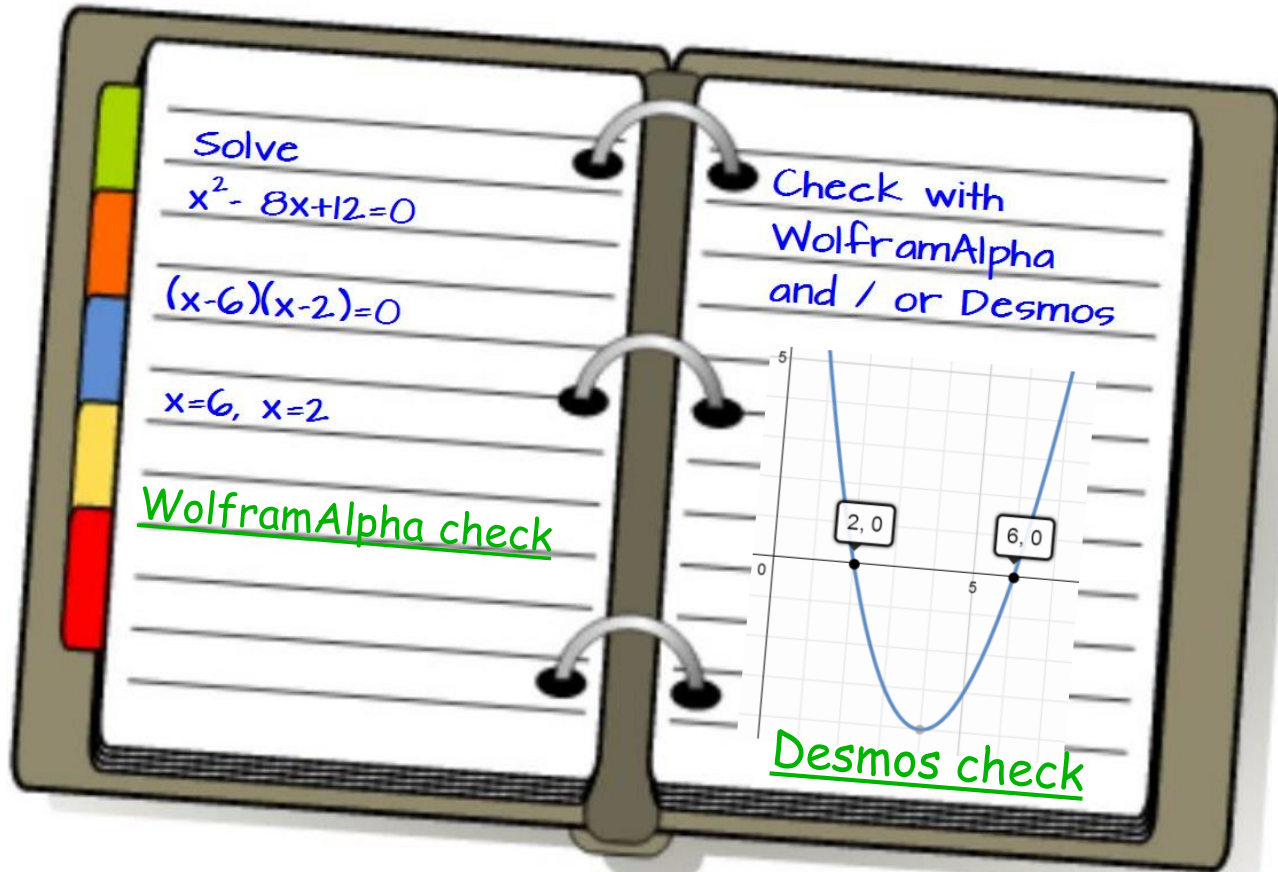
Are you guilty of making any of the **classic mistakes**?

Classic Mistake Nº 15

1 is a prime number ✗

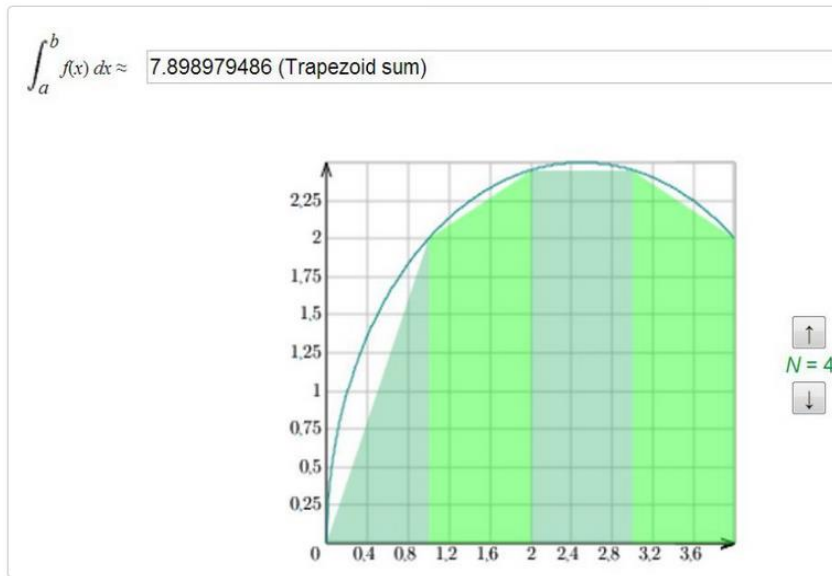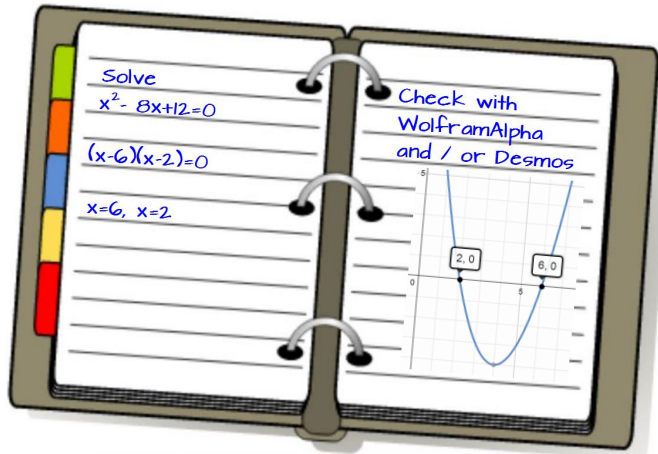"Composite Crime"

3 Always check your work

Solve

$x^2 - 8x + 12 = 0$

$(x-6)(x-2) = 0$

$x = 6, \ x = 2$

WolframAlpha check

Check with
WolframAlpha
and / or Desmos

2, 0   6, 0

Desmos check

Learn to use WolframAlpha

Learn to use Desmos

3 Always check your work

Solve
$x^2 - 8x + 12 = 0$

Check with WolframAlpha and / or Desmos

$(x-6)(x-2) = 0$

$x = 6, \ x = 2$

2, 0   6, 0

$$\int_a^b f(x)\, dx \approx \quad 7.898979486 \text{ (Trapezoid sum)}$$

$N = 4$

Numerical Integration – Zweigmedia

WolframAlpha
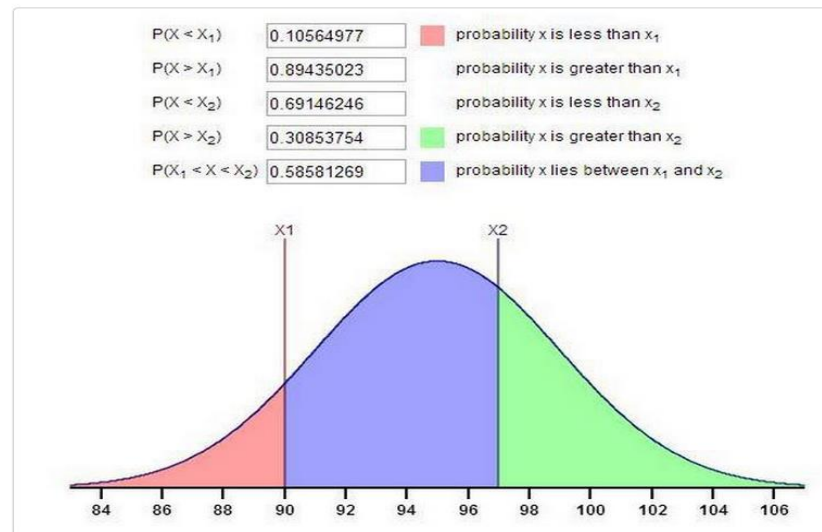
eigenvectors {{1,0,0},{0,0,1},{0,1,0}}

Input:

$$\text{Eigenvectors}\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$$

Results:

$v_1 = (0, -1, 1)$

$v_2 = (0, 1, 1)$

$v_3 = (1, 0, 0)$

|		
$P(X < X_1)$	0.10564977	probability x is less than x_1
$P(X > X_1)$	0.89435023	probability x is greater than x_1
$P(X < X_2)$	0.69146246	probability x is less than x_2
$P(X > X_2)$	0.30853754	probability x is greater than x_2
$P(X_1 < X < X_2)$	0.58581269	probability x lies between x_1 and x_2

X1   X2

Normal Distribution Calculator – Random Science Tools and Calculators
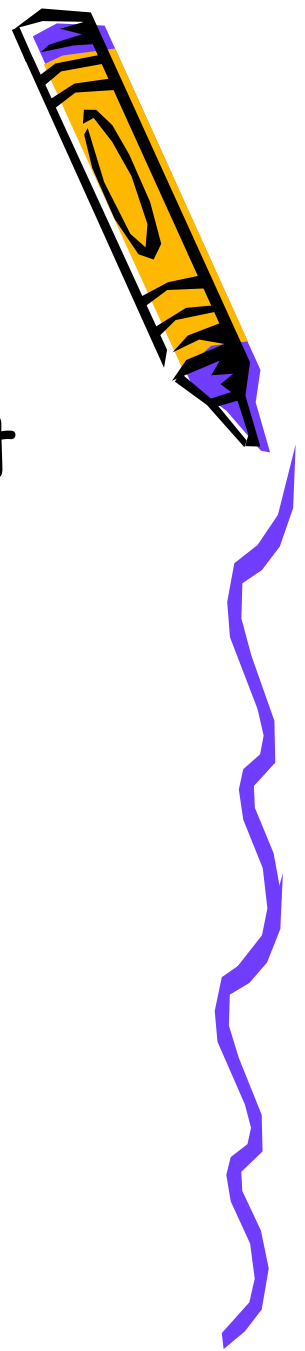
Calculators &Tools

4

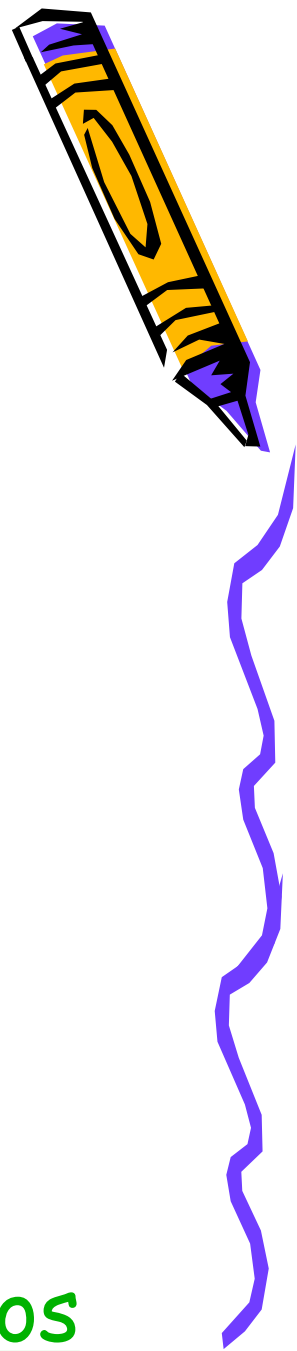Thou shalt ignore the teachings of false prophets to do all thy work in thy head.
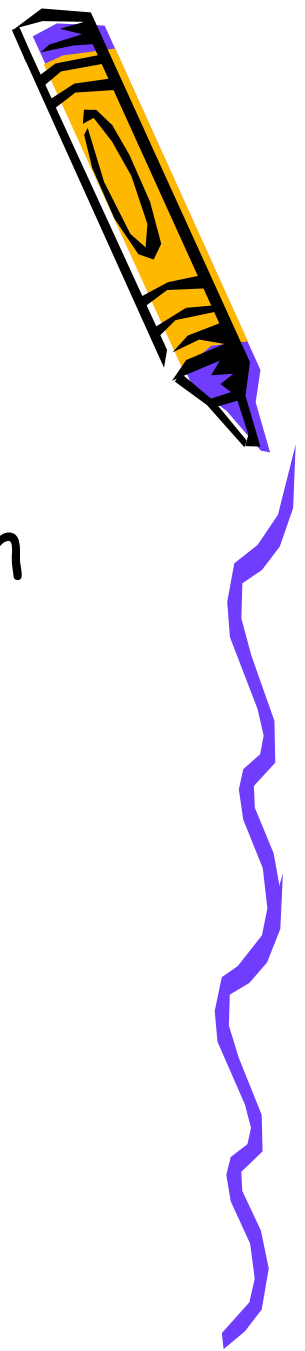
5

When thou knowest not, thou shalt look it up; and if thy search still elude thee, thou shalt ask thy All-Knowing Teacher.

5 Look it up

Never rely on just one source if you are finding a topic tricky, it can be helpful to see explanations and examples written by different authors.
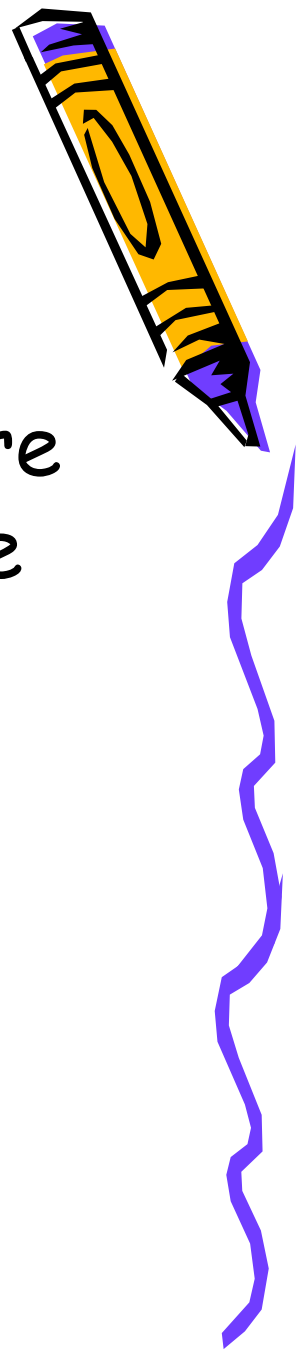
Notes   Videos

6

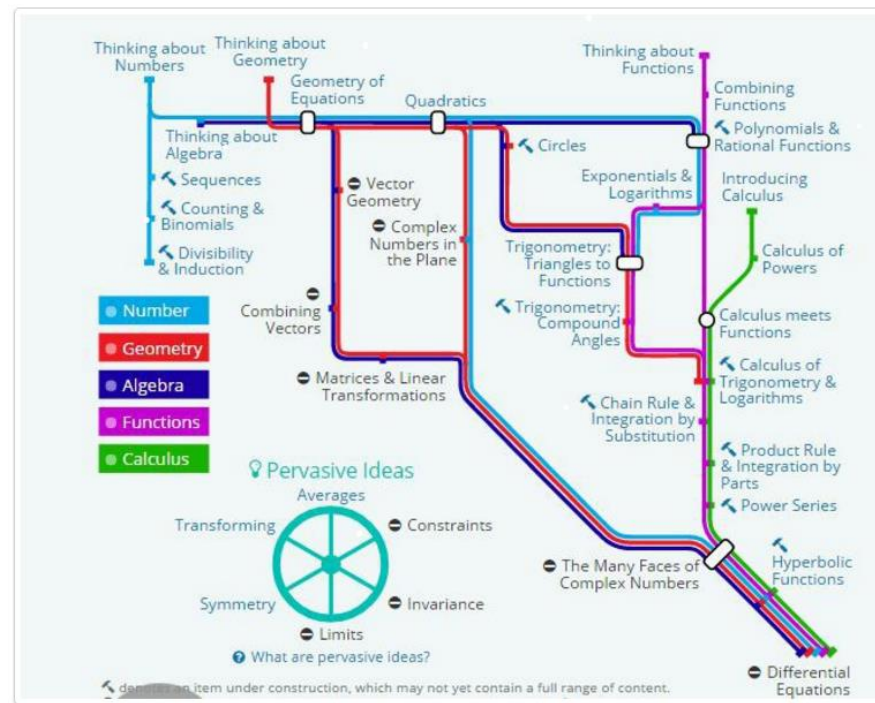Thou shalt master each step before putting thy heavy foot down on the next.
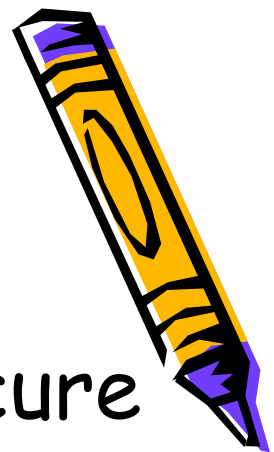
6 Master each step

Try lots of exercises so you are secure in methods.
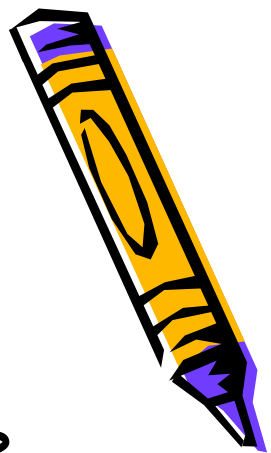
Try some new and challenging problems.

Underground Maths

7
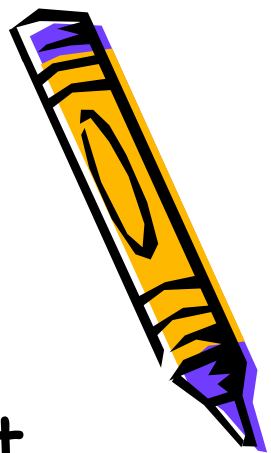
Thy correct answer does not prove that thou hast worked thy problem correctly. This argument convincest none, least of all thy Teacher.
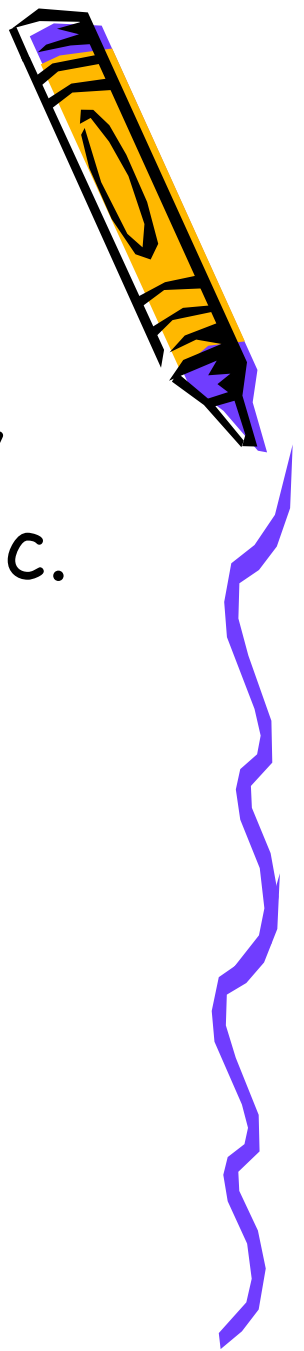
8

Thou shalt first see that thou hast copied thy problem correctly, before bearing false witness that the answer book lieth.
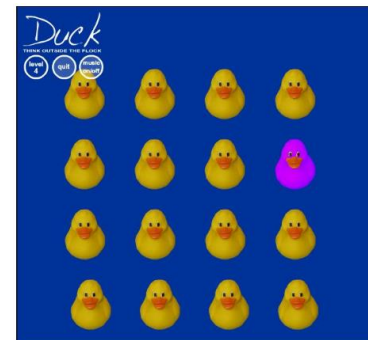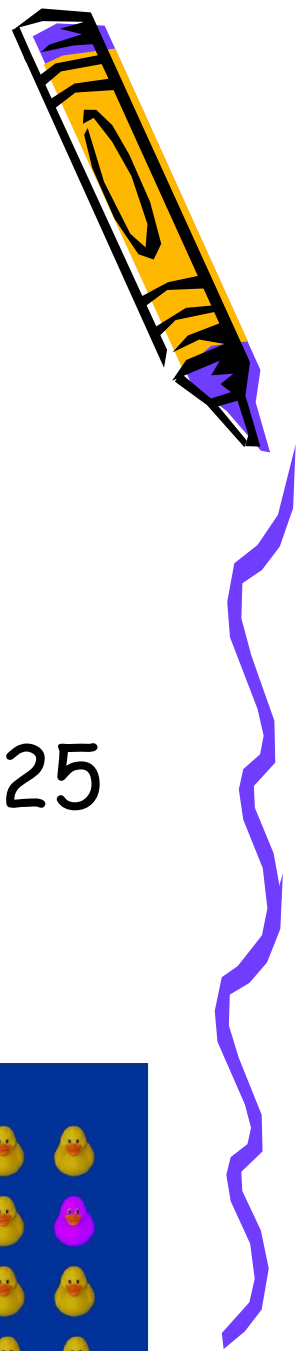
9

Thou shalt look back even unto thy youth and remember thy arithmetic.

9 Remember all the basics

If you want to practise your arithmetic you could **play some games**!

Available on Math Playground, the 25 levels of **Think Outside the Flock** will test your thinking skills!
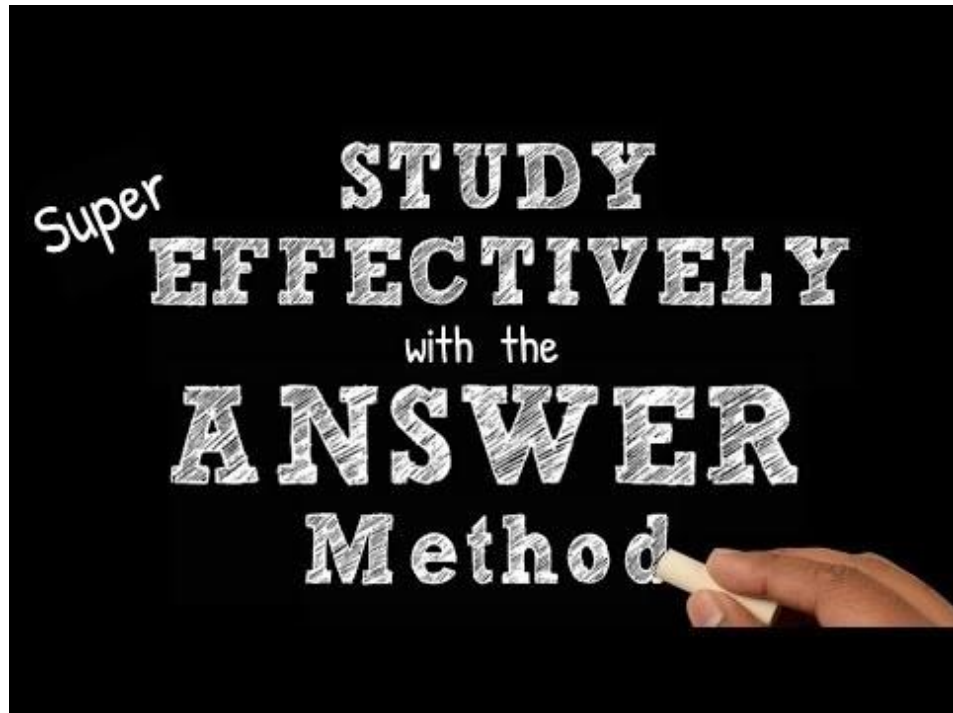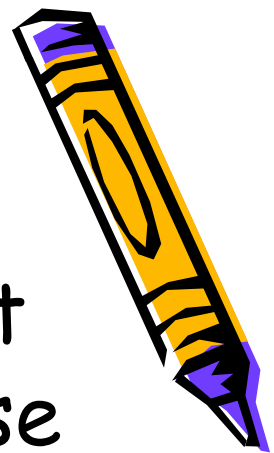
Think Outside the Flock – Bart Bonte

10

Thou shalt learn, read, write ,speak, and listen correctly in the language of mathematics, and verily A's and B's shall follow thee even unto graduation.

10 On Learning Mathematics

Think about *how* you learn, not just what you learn. Have a look at these **Study Strategies from the Learning Scientists.**
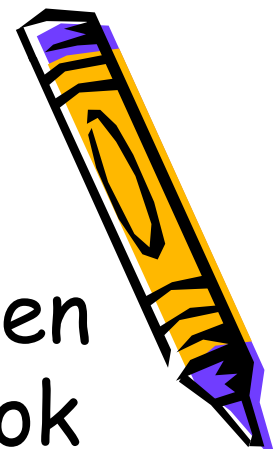
10 Write Mathematics clearly

Do you distinguish carefully between a 1 and a 7 for example? Does 2 look like z or 5 look a bit like a letter s?

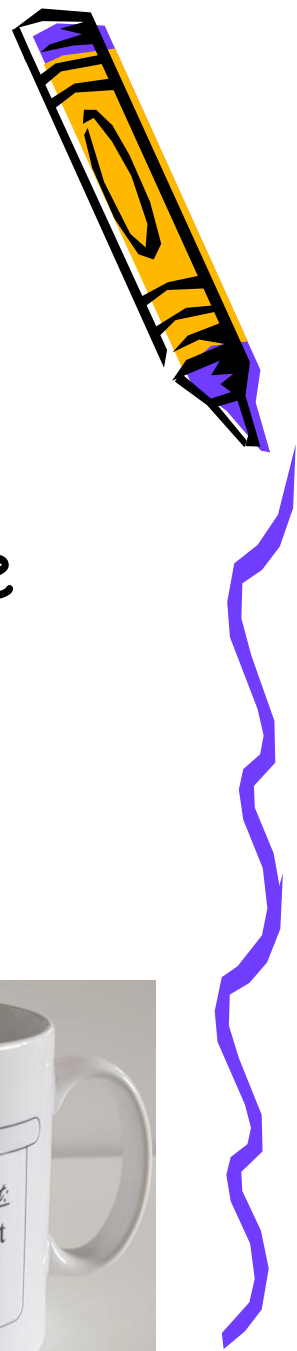From John Kerl see **tips for mathematical handwriting**,

Also have a look at this clear **guide to writing Mathematics** from Dr Kevin P Lee.

11

My own Maths teacher (thank you Mr Hind) taught me the 11th commandment…

Thou shalt not divide by zero.

Thank you …

….to whoever wrote these!

Having trawled the Internet, I can find many copies (and variations) but no attribution to the original author.