



Diploma  
Programme

# Mathematics mind map

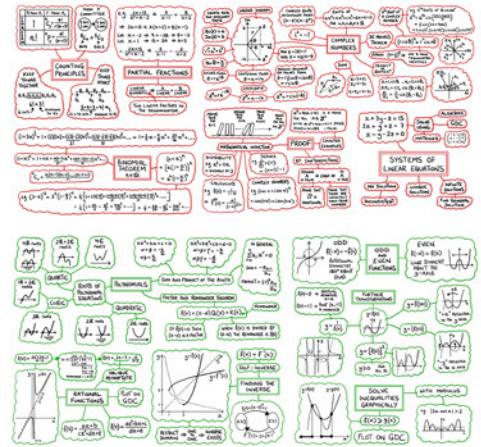
## Common content



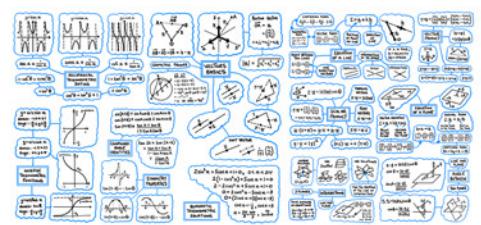
International Baccalaureate®  
Baccalauréat International®  
Bachillerato Internacional®

# Mathematics mind map

## Number and algebra



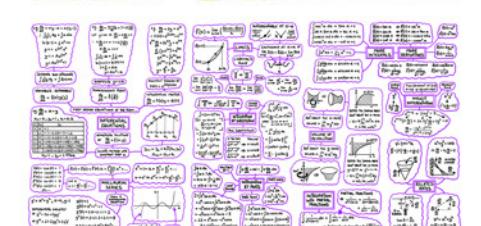
## Functions



## Geometry and trigonometry



## Statistics and probability



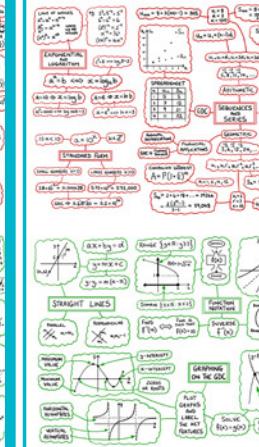
## Calculus

(This section is currently empty)

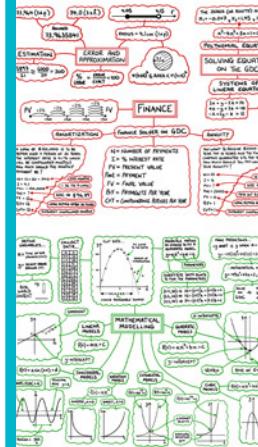
## Analysis and approaches SL



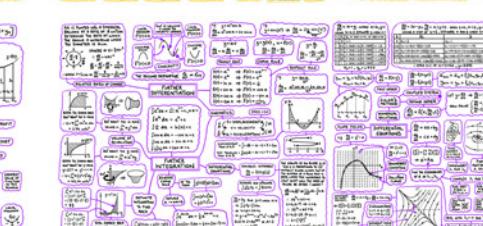
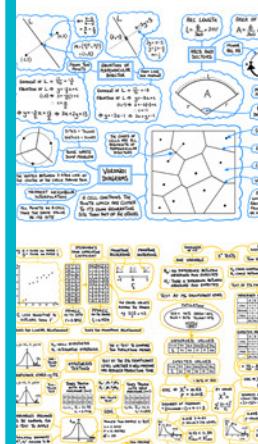
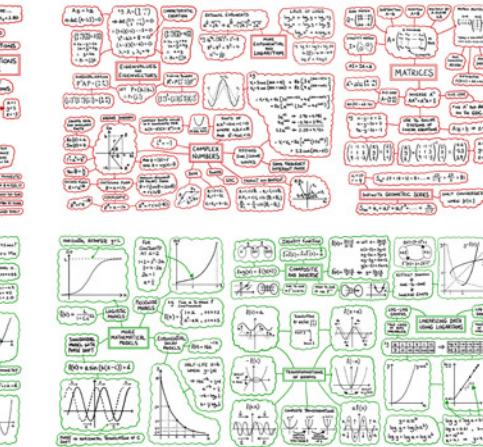
## Common content



## Applications and interpretation SL



## Applications and interpretation AHL



# Number and algebra

LAWS OF INDICES

$$x^a \times x^b = x^{a+b}$$

$$\frac{x^a}{x^b} = x^{a-b}$$

$$(x^a)^b = x^{ab}$$

WHERE a,b ARE INTEGERS

e.g.  $5^3 \times 5^{-6} = 5^{-3}$   
 $6^4 \div 6^3 = 6$   
 $(2^3)^{-4} = 2^{-12}$   
 $x^{-3} = \frac{1}{x^3}$   
 $(2x)^4 = 16x^4$

## EXPONENTIAL AND LOGARITHM

$$2^3 = 8 \Leftrightarrow \log_2 8 = 3$$

$$a^x = b \Leftrightarrow x = \log_a b$$

$$a=10 \Rightarrow x = \log b$$

$$a=e \Rightarrow x = \ln b$$

$$10^3 = 1000 \Leftrightarrow \log 1000 = 3$$

$$x = e^3 \Leftrightarrow \ln x = 3$$

$$1 \leq a < 10 \quad a \times 10^k \quad k \in \mathbb{Z}$$

## STANDARD FORM

SMALL NUMBERS  $k < 0$

$$3.8 \times 10^{-4} = 0.00038$$

LARGE NUMBERS  $k > 0$

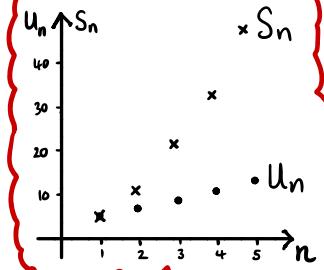
$$5.73 \times 10^5 = 573,000$$

$$\text{GDC} \Rightarrow 5.2 \times 10^{-30} = 5.2 \times 10^{30}$$

$$U_{100} = 8 + 3(100-1) = 305$$

$$U_1 = 8 \\ d = 3 \\ n = 100$$

$$S_{100} = 8 + 11 + 14 + \dots + 305 \\ = \frac{100}{2}(8 + 305) = 15,650$$



$$U_n = U_1 + (n-1)d$$

$$S_n = \frac{n}{2}(U_1 + U_n) \\ = \frac{n}{2}[2U_1 + (n-1)d]$$

$$U_1, U_1+d, U_1+2d, U_1+3d, \dots$$

$$5, 8, 11, 14, \dots$$

## ARITHMETIC

### SPREADSHEET

n	U <sub>n</sub>	S <sub>n</sub>
1	5	5
2	7	12
3	9	21
4	11	32

GDC

## SEQUENCES AND SERIES

### ANNUAL DEPRECIATION

GDC  $\Rightarrow$  FINANCE SOLVER

### COMPOUND INTEREST

$$A = P(1 + \frac{r}{n})^{nt}$$

$$3, 6, 12, 24, \dots$$

## GEOMETRIC

$$U_1, U_1\Gamma, U_1\Gamma^2, U_1\Gamma^3, \dots$$

$$n = 1, 2, 4, 12$$

$$S_n = \frac{U_1(\Gamma^n - 1)}{\Gamma - 1} = \frac{U_1(1 - \Gamma^n)}{1 - \Gamma}$$

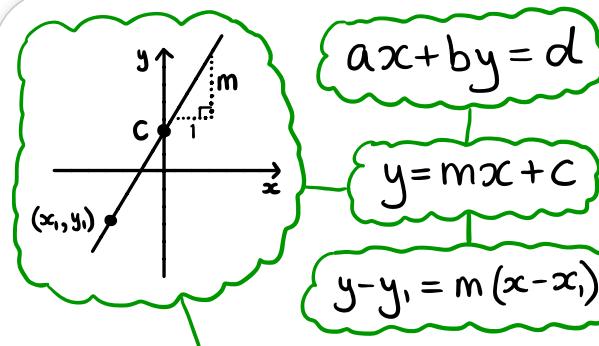
$$S_{10} = 2 + 6 + 18 + \dots + 39366 \\ = \frac{2(3^{10} - 1)}{3 - 1} = 59,048$$

$$U_1 = 2 \\ \Gamma = 3 \\ n = 10$$

$$U_{10} = 2 \times 3^9 = 39366$$

## NOTATION

$$\sum_{i=1}^{10} (3i+2) \\ = 5+8+11+\dots+32 \\ = \frac{10}{2}(5+32) \\ = 185$$



## STRAIGHT LINES

PARALLEL

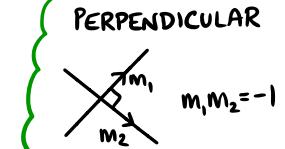


$m_1$

$m_2$

$m_1 = m_2$

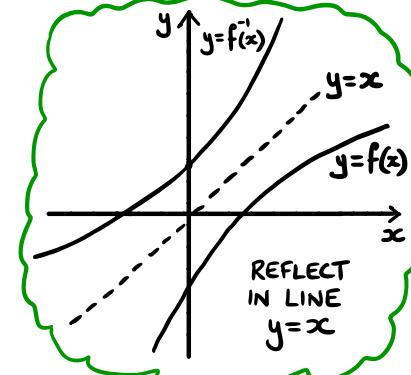
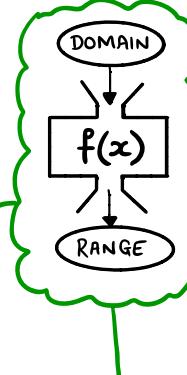
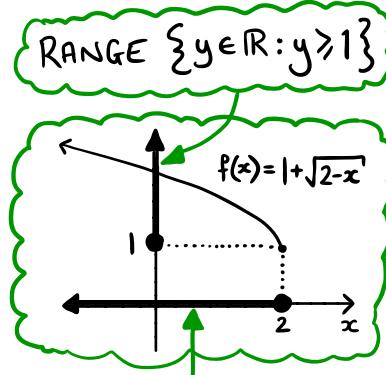
PERPENDICULAR



$m_1$

$m_2$

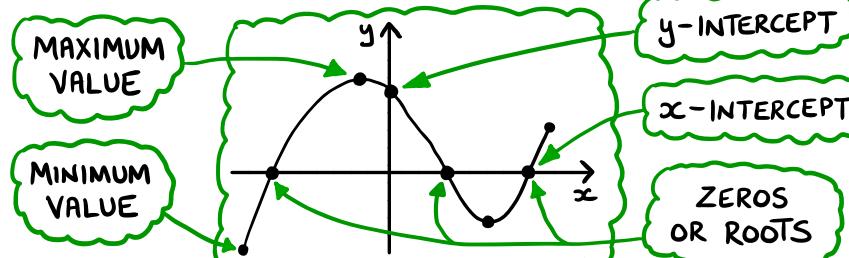
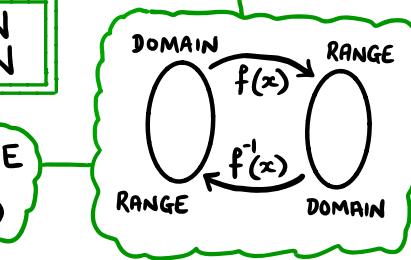
$m_1 \cdot m_2 = -1$



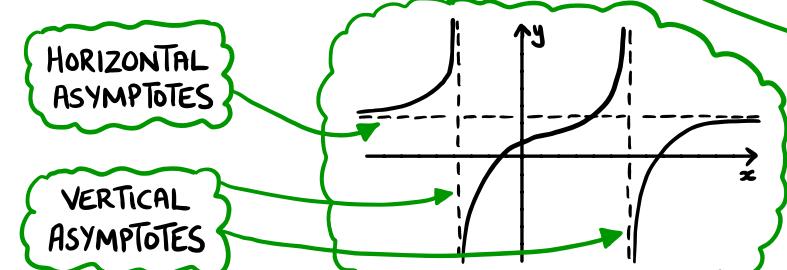
## FUNCTION NOTATION

FIND  $f^{-1}(10)$   $\iff$  FIND  $x$  SUCH THAT  $f(x) = 10$

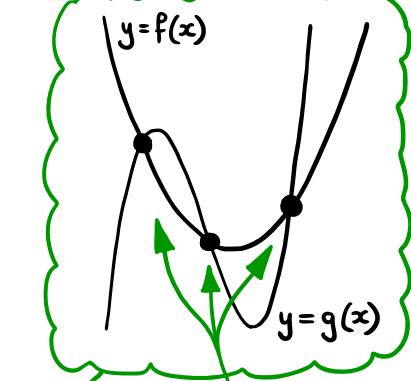
INVERSE  $f^{-1}(x)$



## GRAPHING ON THE GDC



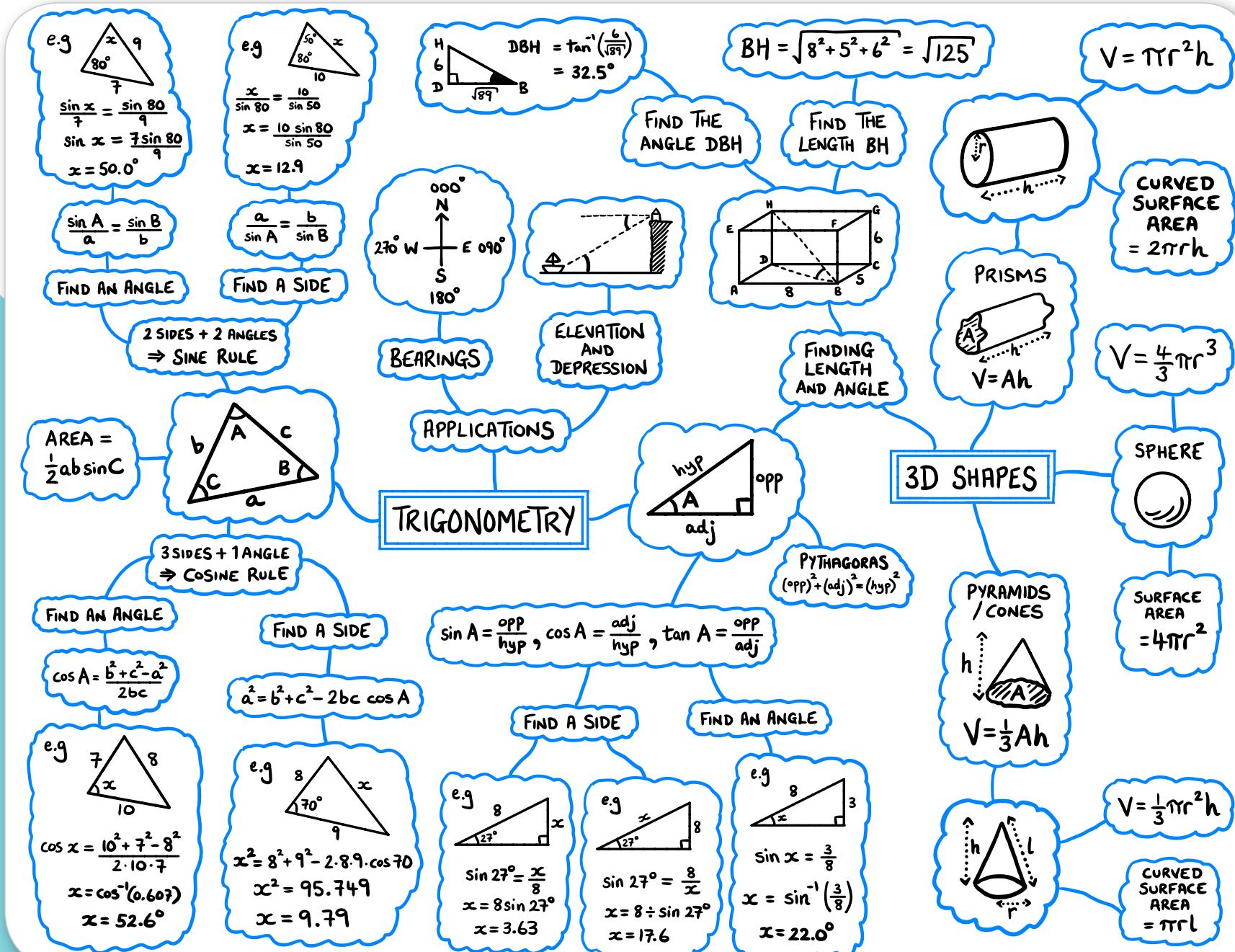
PLOT GRAPHS AND LABEL THE KEY FEATURES



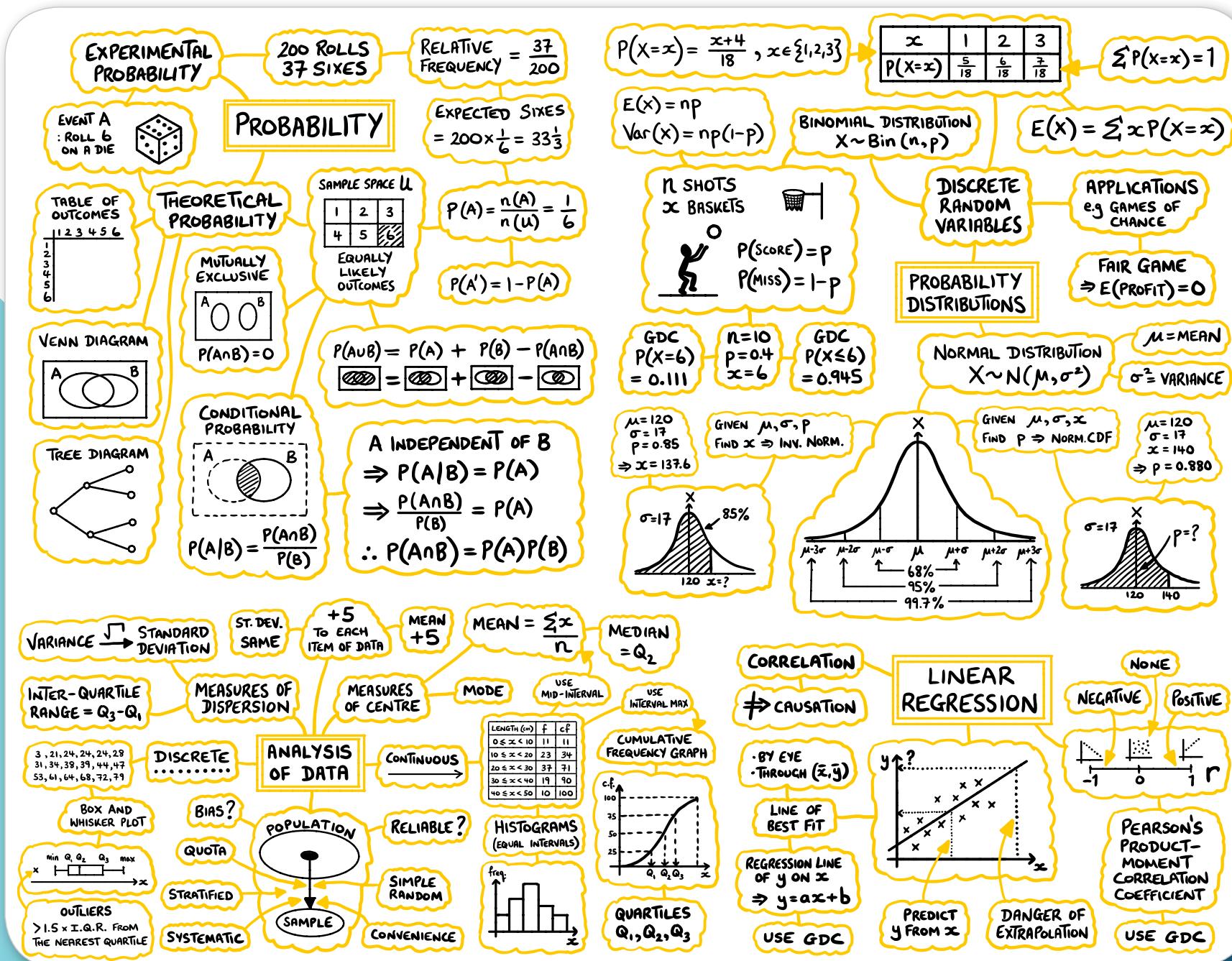
SOLVE  $f(x) = g(x)$

FIND POINTS OF INTERSECTION

# Geometry and trigonometry



# Statistics and probability



## Calculus

