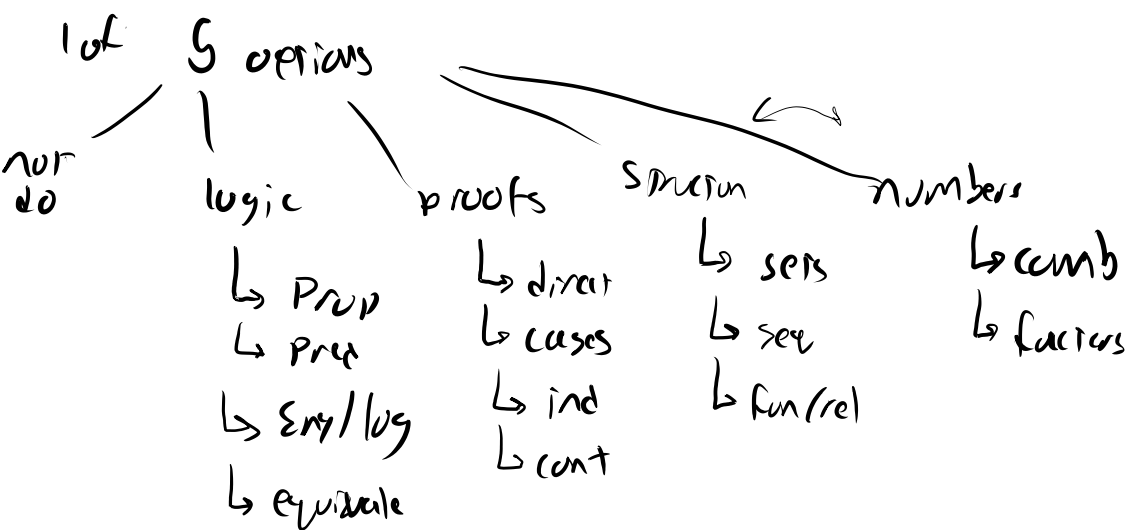


Mon 27 10-11

in-class quiz

option

45 min



wed 29

Feedback
on
IQ12

Thur 30 0-2:59

in-class quiz
optional

3 hr

logic

proofs

structure

numbers

Permutation

↳ reorderings

indistinguishable

$$[3, 1, 4]$$

$$\begin{array}{c} \diagdown \diagup \\ [\quad \quad \quad] \\ 3! \cdot 2! \cdot 1! = 6 \end{array}$$

$$[3, 1, 4, 1] \quad \leftarrow$$

$$[\quad \quad \quad]$$

$$\frac{4! = 24}{2! = 2} = 12$$

choose - not duplicate

↳ perm
keep begin;

$$(3), (1), (1), (5), 9, 2, 6, (5), (3), (5)$$

$$\binom{11}{4}$$

$$\frac{11!}{4! \cdot (11-4)!}$$

$$\frac{11!}{2! \cdot 2! \cdot 3!}$$

11^4 - dp allowed

$$(P \wedge Q) \rightarrow W$$

$$\neg(P \wedge Q) \vee W$$

$$(\neg P \vee \neg Q) \vee W$$

$$\neg P \vee (\neg Q \vee W)$$

$$\neg P \vee (W \vee \neg Q)$$

$$P \rightarrow (W \vee \neg Q)$$

4 3 2



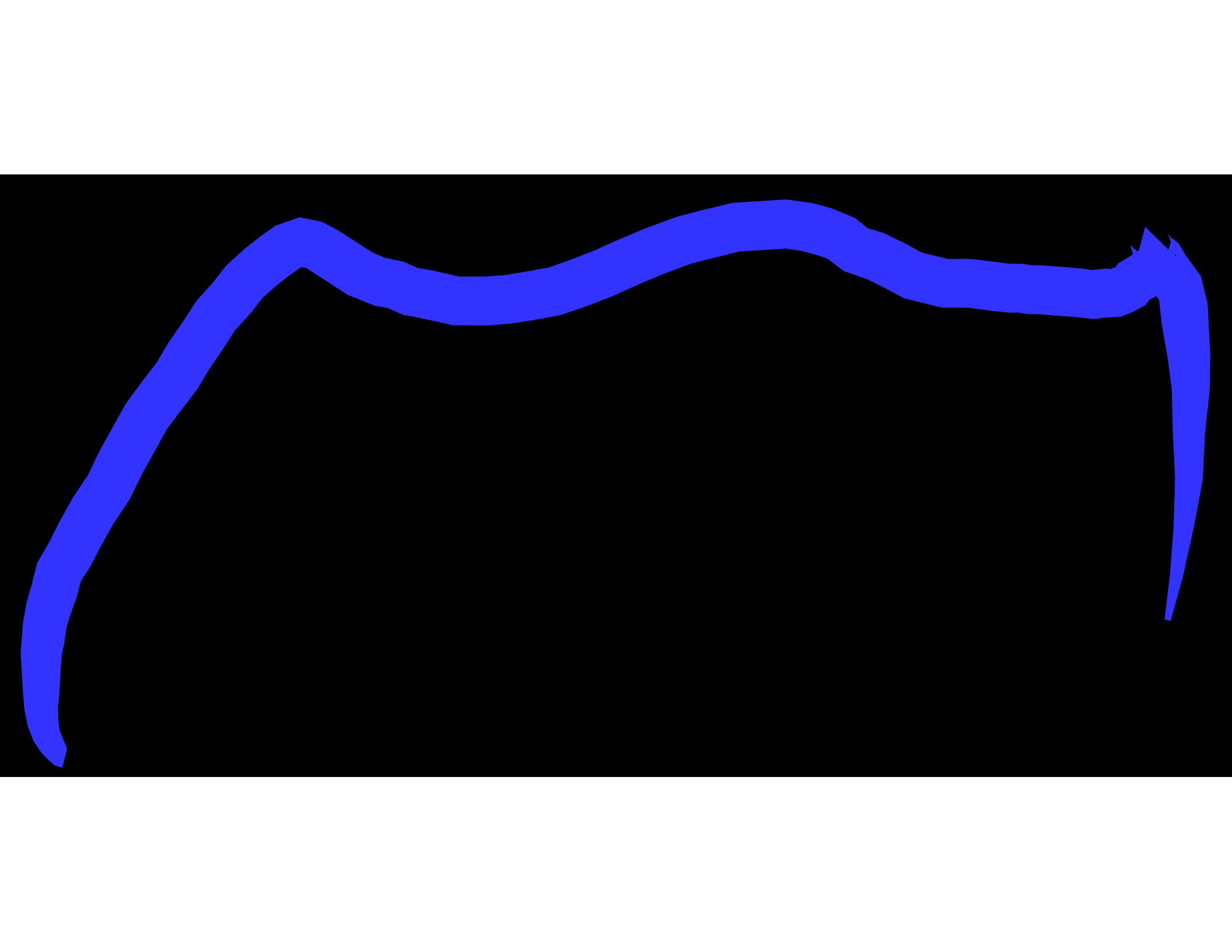
432
423
243
234
324
342

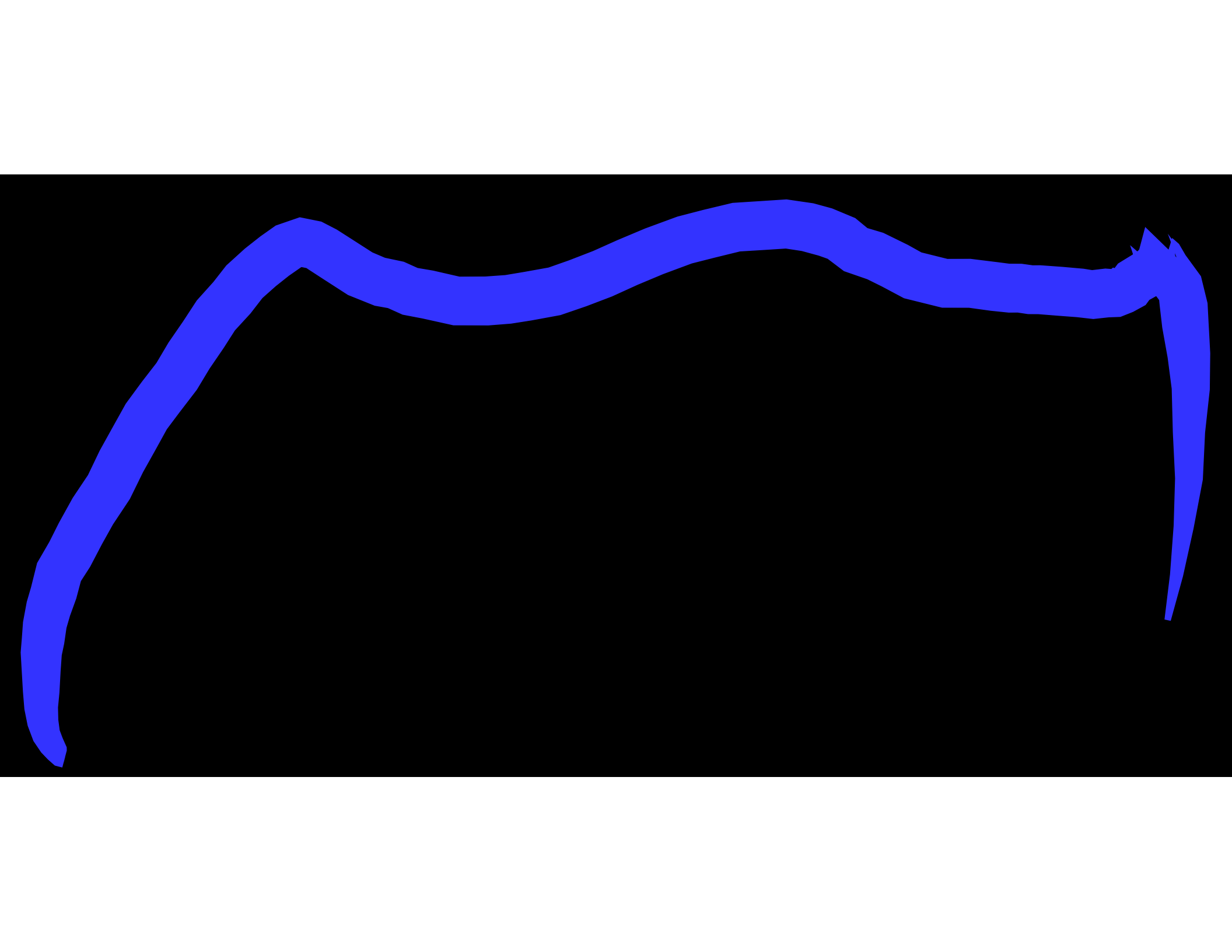
3! = 6

444
443
434
344
442
424
⋮
⋮

222

$3^3 = 27$





$$(P \wedge Q) \vdash P$$

$$(K \wedge M) \vdash K$$

 \models \rightsquigarrow is tautology

$$(P \wedge Q) \vee (K \wedge M)$$

 $a \rightarrow b$

$$\begin{array}{ccc} 0 & 1 & 0 \\ 0 & 1 & 1 \\ \rightsquigarrow & 1 & 0 \\ & 1 & 1 \end{array}$$

$$\equiv ((P \wedge Q) \vee K) \wedge ((P \wedge Q) \vee M)$$

$$\equiv ((P \wedge Q) \vee K)$$

$$\equiv (P \vee K) \wedge (Q \vee K)$$

$$\equiv (P \vee K)$$

Proceed by cases

case $Q = T$

$$(P \wedge T) \vee (K \wedge M) \vdash P \vee K$$

$$P \vee (K \wedge M) \vdash P \vee K$$

... T

case $P = T$
case $P = \perp$

case $Q = \perp$

$$(P \wedge \perp) \vee (K \wedge M)$$

$$\perp \vee (K \wedge M)$$

$$(K \wedge M)$$

case $M = \perp$

$$\perp \vdash P \vee K$$

T

case $M = T$

$$K \vdash P \vee K$$

T

both cases T, Always T

both cases T, always true

Cases

$\vdash A \vee B$

Case — $A \vdash C$

Case — $B \vdash C$

$\therefore C$