# TODO List

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Not sure why I need to make a TODO list in LaTeXbut here I am. ✓means ok, no ✓means no ok.
The Lean part is split into three sections, the ABC: Asymptotics, Bridge and Construction.
Lean Construction:

1. ✓Definition of `CornerFree`
2. ✓Definition of construction (`IsInCons` and $A_r$)
3. ✓Computable definitions
4. ✓Prove base case of induction ($(x+d)_0+y_0=x_0+(y+d)_0$)
5. Prove inductive case of induction ($(x+d)_i+y_i=x_i+(y+d)_i$)
6. ✓Conclude lemma 0.2 ($\pi(x+d)+\pi(y)=\pi(x)+\pi(y+d)$).
7. Combine lemma 0.1 with parallelogram law to get $b=0$.
8. ✓Conclude that $A_r$ is corner-free.

Lean Asymptotics:

1. ✓Prove asymptotics 1 ($q=(c+o(1))^d$.)
2. ✓Prove asymptotics 2 ($d=(1+o(1))\sqrt{\cdots}$.)
3. Prove the "short calculation".

Lean Bridge:

1. Show that there are $(\frac{3}{4}q^2+O(q))^d$ pairs of $(x,y)$ with $\frac{q}{2}\le x_i+y_i<\frac{3q}{2}$.
2. Apply pigeonhole principle to get $\#A_r\ge(dq^2)^{-1}(\frac{3}{4}q^2+O(q))^d$ (PP on the norm).

Essay:

1. `sec1-intro`
2. ✓`sec2-background`
3. ✓`sec3-lean-and-mathlib`
4. ✓`sec4-limits`
5. `sec5-proof-breakdown`
6. `sec6-impl-construction`
7. `sec7-impl-asymptotics`
8. `sec8-impl-bridge`
9. `sec9-correctness`
10. `sec10-conclusion`
11. ✓`sec11-acknowledgement`