Exercise 3.9.2

Introduction to Discrete Mathematics
MATH 2001

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ABSTRACT. This is Exercise 3.9.2 from Hammack [Ham13, §3.9]:

Exercise 3.9.2. You deal a pile of cards, face down, from a standard 52-card deck. What is the least number of cards the pile must have before you can be assured that it contains at least five cards of the same suit?

Solution. Imagine that you are dealing out the cards into piles determined by the suit. Clearly, the worst case scenario is that we deal four cards of each suit, giving 16 cards, before we deal out the 17th card, which must give us a pile of cards with five cards of the same suit. Thus the answer is 17 cards.

To put this in the language of the Division Principle, we want to know the least natural number n such that

$$\left\lceil \frac{n}{4} \right\rceil = 5$$

The answer is $n = 17$. □

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REFERENCES

[Ham13] Richard Hammack, *Book of proof*, Creative Commons, 2013.

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