

國立臺北教育大學 97 學年度碩士班招生入學考試

數學教育研究所 數學教育 科試題

一般在職

一、「培養欣賞數學的態度和能力」是九年一貫的數學課程期望學生達成的目標之一，請問你要如何將此目標落實到國小數學教學中？（25 分）

二、請先說明“隱藏模式（Implicit model 或 Tacit model）”的內容，再以隱藏模式來解釋為什麼學生解“一公斤的蓮霧賣 120 元，問 0.8 公斤的蓮霧可以賣多少錢？”時會採用 $120 \div 0.8$ 的方法來解題。（25 分）

三、近年來應用學習軌道理論於數學課程發展與設計，是最受歡迎的觀點之一。請說明學習軌道理論（*Hypothetical Learning Trajectories*）的意涵與假設，並選一個概念為主題去設計一個研究計畫將學習軌道理論融入此概念學習的課程，安排符合學生學習此概念發展歷程必要的活動，用以探討學習軌道理論應用於數學領域之合適性。（25 分）

四、底下是一篇論文<<*Teaching and Learning Fraction Addition on Number Lines*>> 的摘要，請說明此研究之主旨、研究問題、研究方法、研究結果及提出你對數線教學的看法。（25 分）

We present a case study of teaching and learning fraction addition on number lines in one 6th-grade classroom that used the Connected Mathematics Project *Bits and Pieces II* materials. Our main research questions were (1) What were the primary cognitive structures through which the teacher and students interpreted the lessons? and (2) Were the teacher's and her students' interpretations similar or different, and why? The data afforded particularly detailed analyses of cognitive structures used by the teacher and one student to

interpret fractions and their representation on number lines.

Our results demonstrate that subtle differences in methods for partitioning unit intervals did not seem important to the teacher but had significant consequences for this student's opportunities to learn. Our closing discussion addresses knowledge for teaching with drawn representations and methods for examining interactions between teachers' and students' interpretations of lessons in which they participate together.