Solutions to J. Peter May's
A Concise Course in Algebraic Topology

Patrick Borse

ABSTRACT. This document contains solutions to the problems of J. Peter May's *A Concise Course in Algebraic Topology*.

Contents

The fundamental group and some of its applications

Problem 1.

Problem 2.

Problem 3.

CHAPTER 2

Categorical language and the van Kampen theorem

Problem 4.

Problem 5.

Problem 6.

Problem 7.

CHAPTER 3

Covering spaces

Problem 8.

Problem 9.

Problem 10.

Problem 11.

Problem 12.

Problem 13.

CHAPTER 4

Graphs

Problem 14.

Problem 15.

Problem 16.

Compactly generated spaces

Problem 17.

Problem 18.

Problem 19.

Cofibrations

Problem 20.

Problem 21.

CHAPTER 7

Fibrations

Problem 22.

CHAPTER 8

Based cofiber and fiber sequences

Problem 23.

CHAPTER 9

Higher homotopy groups

Problem 24.

Problem 25.

Problem 26.

Problem 27.

Problem 28.

Problem 29.

CHAPTER 10

CW complexes

Problem 30.

Problem 31.

Problem 32.

Problem 33.

Problem 34.

A little homological algebra

Problem 35.

Problem 36.

Problem 37.

CHAPTER 13

Axiomatic and cellular homology theory

Problem 38.

Problem 39.

Problem 40.

Problem 41.

Problem 42.

CHAPTER 14

Derivations of properties from the axioms

Problem 43.

CHAPTER 15

The Hurewicz and uniqueness theorems

Problem 44.

Problem 45.

Problem 46.

Problem 47.

Problem 48.

Problem 49.

Problem 50.

CHAPTER 16

Singular homology theory

Problem 51.

Problem 52.

Problem 53.

CHAPTER 18

Axiomatic and cellular cohomology theory

Problem 54.

Problem 55.

Problem 56.

Problem 57.

Problem 58.

Problem 59.

Problem 60.

Problem 61.

Problem 62.

CHAPTER 19

Derivations of properties from the axioms

Problem 63.

Problem 64.

Problem 65.

Problem 66.

Problem 67.

The Poincaré duality theorem

Problem 68.

Problem 69.

Problem 70.

Problem 71.

Problem 72.

Problem 73.

Problem 74.

CHAPTER 21

The index of manifolds; manifolds with boundary

Problem 75.

Problem 76.

Problem 77.

Problem 78.

Problem 79.

Problem 80.

Problem 81.

Problem 82.

CHAPTER 22

Homology, cohomology, and $K(\pi, n)$s

Problem 83.

Problem 84.

Problem 85.

Problem 86.

Problem 87.

CHAPTER 23

Characteristic classes of vector bundles

Problem 88.

Problem 89.

Problem 90.

Problem 91.

Problem 92.