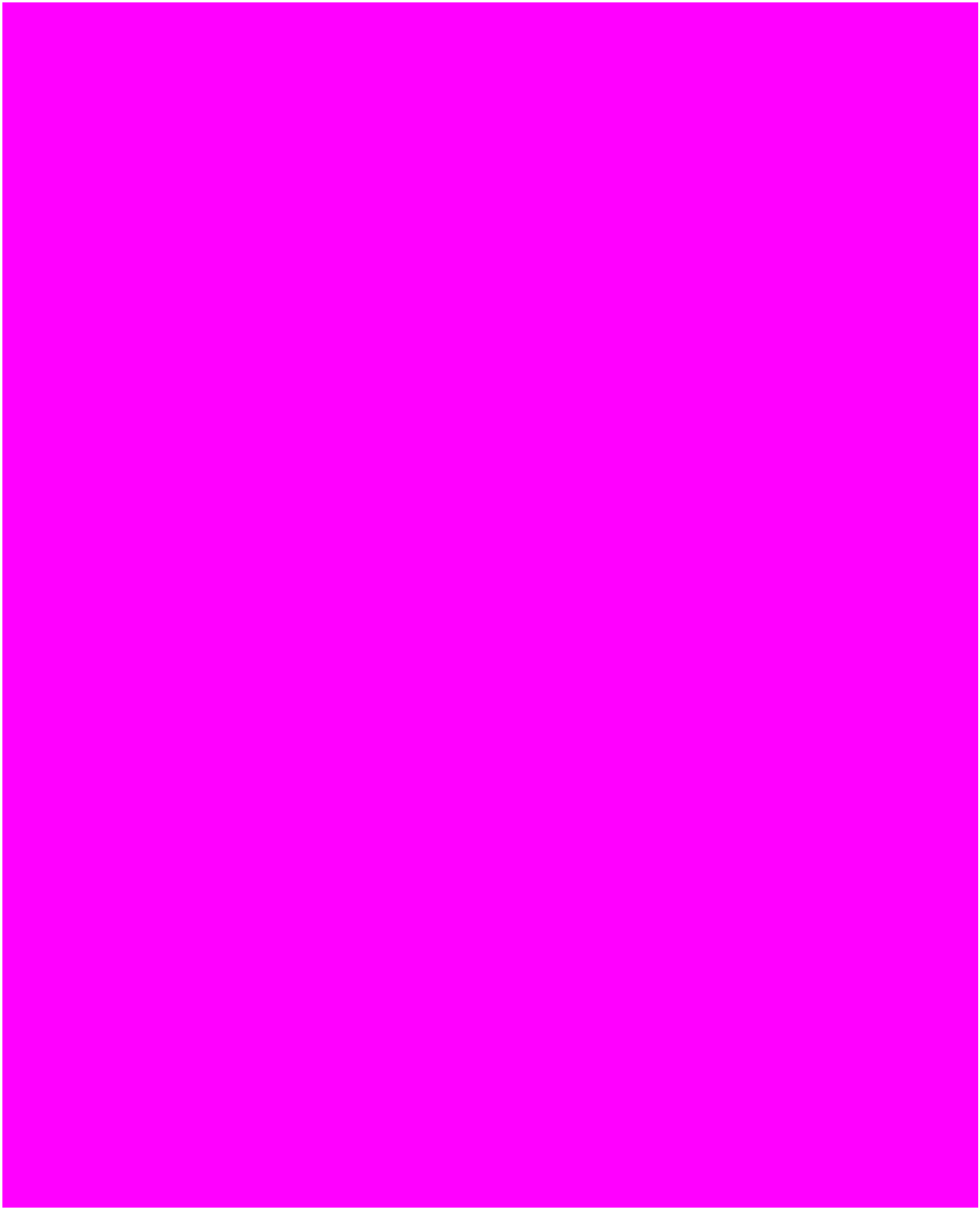
Tonal Harmony

WITH AN INTRODUCTION TO POST-TONAL MUSIC



Ninth Edition

Tonal Harmony

WITH AN INTRODUCTION TO POST-TONAL MUSIC

Stefan Kostka

THE UNIVERSITY OF TEXAS AT AUSTIN

Byron Almén

THE UNIVERSITY OF TEXAS AT AUSTIN

Mc Graw Hill

TONAL HARMONY WITH AN INTRODUCTION TO POST-TONAL MUSIC, NINTH EDITION

This book is printed on acid-free paper.

1 2 3 4 5 6 7 8 9 LWI 28 27 26 25 24 23

ISBN 978-1-264-09475-2 (bound edition)
MHID 1-264-09475-2 (bound edition)
ISBN 978-1-265-30735-6 (loose-leaf edition)
MHID 1-265-30735-0 (loose-leaf edition)

Portfolio Manager: *Sarah Remington*
Product Developer: *Dawn Groundwater*
Content Project Managers: *Rick Hecker, Vanessa McClune*
Buyer: *Laura Fuller*
Designer: *Beth Blech*
Content Licensing Specialist: *Brianna Kirschbaum*
Cover Image: *abstract/Shutterstock*
Compositor: *MPS Limited*

Library of Congress Cataloging-in-Publication Data

Names: Kostka, Stefan M., author. | Almén, Byron, 1968- author.
Title: Tonal harmony with an introduction to post-tonal music / Stefan Kostka, Byron Almén.
Description: Ninth edition. | New York : McGraw Hill, 2024. | Includes index.
Identifiers: LCCN 2022016348 | ISBN 9781264094752 (hardcover) | ISBN 9781265307356 (spiral bound)
Subjects: LCSH: Harmony.
Classification: LCC MT50 .K85 2024 | DDC 781.2/5—dc23/eng/20220404
LC record available at https://lccn.loc.gov/2022016348

mheducation.com/highered

About the Authors

STEFAN KOSTKA

Holds degrees in music from the University of Colorado and the University of Texas and received his Ph.D. in music theory from the University of Wisconsin. He was a member of the faculty of the Eastman School of Music from 1969 to 1973. Since that time he has been on the faculty of the University of Texas at Austin, now holding the rank of Professor Emeritus. Dr. Kostka initiated courses in computer applications in music at both the Eastman School and the University of Texas. Later, he specialized in courses in atonal theory and contemporary styles and techniques, interests that led to a second book, *Materials and Techniques of Post-Tonal Music,* and, with Roger Graybill, *Anthology of Music for Analysis.* Dr. Kostka is active in various professional organizations and is a past president of the Texas Society for Music Theory.

BYRON ALMÉN

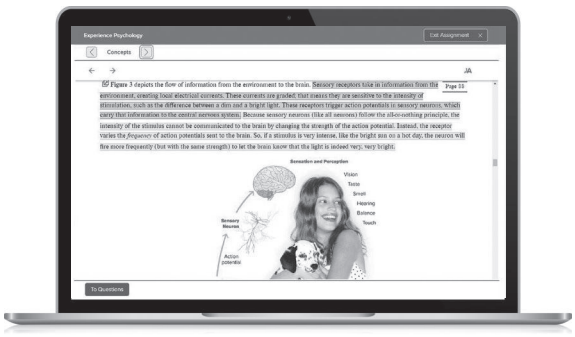
Holds a bachelor's degree in music and physics from St. Olaf College, a master's degree in piano performance from Indiana University, and a Ph.D. in music theory from Indiana University. He was a member of the faculty of the University of Texas at Austin from 1998 to 2019, where he taught courses in the undergraduate harmony sequence, as well as graduate courses in music theory pedagogy, the history of music theory, and score reading. Dr. Almén is the author of *A Theory of Musical Narrative* and the coauthor, with Edward Pearsall, of *Approaches to Meaning in Music,* both published by Indiana University Press, along with numerous articles and book chapters. He is the winner of several teaching awards, including the prestigious University of Texas System Regents' Outstanding Teaching Award. In addition to his continued performing activities as a pianist, organist, and choral director, he is active in professional organizations in music and psychology. He also has an active psychotherapy practice in Minneapolis, MN.

Instructors
Student Success Starts with You

Tools to enhance your unique voice

Want to build your own course? No problem. Prefer to use an OLC-aligned, prebuilt course? Easy. Want to make changes throughout the semester? Sure. And you'll save time with Connect's auto-grading, too.

65%
Less Time Grading



Laptop: Getty Images; Woman/dog: George Doyle/Getty Images

A unique path for each student

In Connect, instructors can assign an adaptive reading experience with SmartBook® 2.0. Rooted in advanced learning science principles, SmartBook 2.0 delivers each student a personalized experience, focusing students on their learning gaps, ensuring that the time they spend studying is time well-spent.
mheducation.com/highered/connect/smartbook

Affordable solutions, added value

Make technology work for you with LMS integration for single sign-on access, mobile access to the digital textbook, and reports to quickly show you how each of your students is doing. And with our Inclusive Access program, you can provide all these tools at the lowest available market price to your students. Ask your McGraw Hill representative for more information.

Solutions for your challenges

A product isn't a solution. Real solutions are affordable, reliable, and come with training and ongoing support when you need it and how you want it. Visit **supportateverystep.com** for videos and resources both you and your students can use throughout the term.

SUPPORT AT every step

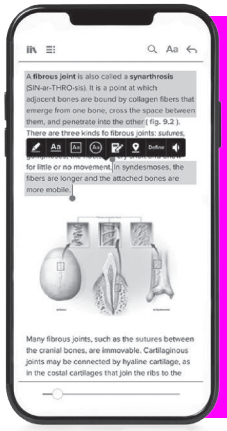
Students
Get Learning that Fits You

Effective tools for efficient studying

Connect is designed to help you be more productive with simple, flexible, intuitive tools that maximize your study time and meet your individual learning needs. Get learning that works for you with Connect.

Study anytime, anywhere

Download the free ReadAnywhere® app and access your online eBook, SmartBook® 2.0, or Adaptive Learning Assignments when it's convenient, even if you're offline. And since the app automatically syncs with your Connect account, all of your work is available every time you open it. Find out more at **mheducation.com/readanywhere**



iPhone: Getty Images

"I really liked this app—it made it easy to study when you don't have your textbook in front of you."

- Jordan Cunningham,
Eastern Washington University

Everything you need in one place

Your Connect course has everything you need—whether reading your digital eBook or completing assignments for class, Connect makes it easy to get your work done.

Learning for everyone

McGraw Hill works directly with Accessibility Services Departments and faculty to meet the learning needs of all students. Please contact your Accessibility Services Office and ask them to email accessibility@mheducation.com, or visit **mheducation.com/about/accessibility** for more information.

Connect for *Tonal Harmony* helps students harness what inspires them and achieve their musical aspirations.

For a generation of professionals in the musical community, *Tonal Harmony* has provided a comprehensive, yet accessible and highly practical, set of tools for understanding music. With McGraw Hill's Connect with SmartBook, students are better equipped to understand and master the vocabulary of music efficiently, allowing them to move on more quickly to advanced musical skill-building.

Mc Graw Hill connect®

Connect is McGraw Hill's integrated educational platform, which seamlessly joins the superior content of *Tonal Harmony* with enhanced digital tools and assignable activities. Connect delivers precisely what students and instructors need, when and how they need it.

WORKBOOK WITH EMBEDDED AUDIO

Included in Connect for *Tonal Harmony* is the eBook workbook. All audio excerpts needed to complete the workbook exercises are embedded in the eBook workbook. The eBook workbook also offers self-highlighting and the ability to add notes.

WANT A PHYSICAL BOOK? NO PROBLEM

Students have the flexibility to purchase course resources in whatever way they choose, allowing them to achieve the best results at the best price. Once a student purchases a Connect access code and registers for a course, they can purchase a loose-leaf textbook and workbook package.

Preface

Tonal Harmony with an Introduction to Post-Tonal Music is intended for a two-year course in music theory/harmony. It offers a clear and thorough introduction to the resources and practice of Western music from the seventeenth century to the present day. Its concise, one-volume format and flexible approach make the book usable in a broad range of theory curricula.

Approach

The text provides students with a comprehensive but accessible and highly practical set of tools for the understanding of music. Actual musical practice is emphasized more than rules or prohibitions. Principles are explained and illustrated, and exceptions are noted.

In its presentation of harmonic procedures, the text introduces students to the most common vocal and instrumental textures encountered in tonal music. Traditional four-part chorale settings are used to introduce many concepts, but various instrumental and vocal textures are also presented in illustrations and drill work, along with a variety of keyboard styles. To encourage the correlation of writing and performing skills, we have included musical examples in score and reduced-score formats, as well as appendices on instrumental ranges and transpositions and lead-sheet symbols. Some of the assignments ask the student to write for small ensembles suitable for performance in class. Instructors may modify these assignments to make them most appropriate for their particular situations.

Pedagogical Features

The text employs a variety of techniques to clarify underlying voice leading, harmonic structure, counterpoint, and formal procedures. These include textural reductions, accompanying many of the examples, which highlight underlying voice leading. Our goal has been to elucidate tonal logic at the phrase and section level, as well as from one chord to the next. Abundant musical illustrations, most with commentaries, serve as a springboard for class discussion and individual understanding. Similarly, exercises in tonal counterpoint allow students to observe the workings of basic principles of melodic combination in relation to typical outer-voice textures in tonal compositions.

The book provides an extensive series of review material. A large portion of the text is devoted to Self-Tests, consisting of student-graded drills in chord spelling, part writing, and analysis, with suggested answers given in Appendix D. The Self-Tests can be used for in-class drill and discussion, in preparation for the Workbook exercises or for independent study. Periodic Checkpoints enable students to gauge their understanding of the preceding material. Chapter summaries highlight the key points of each chapter. A glossary of the bolded terms found throughout the text is also included.

Organization

Part One (Chapters 1–4) begins the text with two chapters that provide a thorough but concise overview of the fundamentals of music, divided into one chapter each on pitch and rhythm. These chapters may be assigned in reverse order, if desired, except for the review questions in Chapter 2. Chapters 3 and 4 introduce the student to triads and seventh chords in various inversions and textures and places them in their tonal contexts.

Part Two (Chapters 5–13) opens with two chapters on the principles of voice leading, with practice limited to root position triads. Chapter 7 follows with a systematic discussion of normative harmonic progressions. Subsequent chapters deal with triads in inversion (Chapters 8 and 9), basic elements of musical form (Chapter 10), counterpoint (Chapters 11 and 12), and nonchord tones (Chapters 12 and 13).

Part Three (Chapters 14–15) is devoted entirely to diatonic seventh chords, moving from the dominant seventh in root position and inversion (Chapter 14) through the supertonic and leading-tone sevenths to the remaining diatonic seventh chords (Chapter 15).

Part Four begins the study of chromaticism with secondary functions (Chapters 16–17) and modulation (Chapters 18–19), concluding in Chapter 20 with a discussion of larger musical forms.

Chromaticism continues to be the main topic in Part Five (Chapters 21–25), which covers mode mixture, the Neapolitan, augmented sixth chords, enharmonicism, and other elements. The final chapter of this section concentrates on harmony in the late nineteenth century.

Part Six (Chapters 26–28) provides a substantial introduction to post-tonal music, beginning in Chapter 26, with a survey of scales, chord structures, voice leading, and aspects of rhythm. Chapter 27 discusses the basics of atonal theory, including pitch-class sets, twelve-tone serialism, and total serialism. Appendix C, a list of set-classes, is a useful supplement to this chapter. More recent developments, such as indeterminacy, minimalism, and electronic and computer music, are discussed in the final chapter.

Workbook

Through Connect, the *Tonal Harmony* eBook workbook contains embedded music. The eBook workbook also offers self-highlighting, the ability to add notes, and glossary rollovers. Each set of exercises in the workbook is closely correlated with the corresponding chapter of the text and with a particular Self-Test within the chapter. Each set of workbook exercises begins with problems similar to those found in the corresponding Self-Test, but the workbook exercises also include problems that are too open-ended for the Self-Test format, as well as more creative types of compositional problems for those instructors who like to include this type of work.

RECORDINGS

Recordings of virtually all the examples from music literature found in the text and the workbook are available with the ninth edition. A disc containing all the mp3s for music references in the core text is available for purchase, and the mp3s are also in Connect. The recordings that accompany the workbook are now available exclusively in Connect and embedded for easy access in the eWorkbook. All examples were recorded using the same instrumentations seen in the text and workbook examples.

New to This Edition

Although the sequence of chapters is unchanged in this edition, revisions, both major and minor, have been made throughout. The most changed is Chapter 27, in which the discussion of atonal theory has been heavily revised. The revision covers much the same ground, but the emphasis has been shifted away from the mathematical aspects of set theory in favor of its practical application in composition and analysis. Eleven new examples are included in the presentation, along with new Self-Test and Workbook exercises.

This edition also features a number of new musical examples from literature, chosen for relevance, clarity, and aesthetic appeal. Some adjustments were made to the placement and ordering of exercises in the Self-Tests and in the workbook. The Glossary has also been expanded with new and clarified entries to support the main body of the text more fully.

Another substantive change is the availability of workbook exercises in our Connect bank so that they can be assigned and submitted digitally. This is a further expansion of our digital content, continuing from the previous edition, allowing users to more precisely tailor their class management strategies to the needs of their students.

Acknowledgments

Many colleagues and friends provided assistance and encouragement during the development of the first edition of this text, notably Professors Douglass Green, Jerry Grigadean, and Janet McGaughey. Reviewers of the manuscript contributed many helpful suggestions. Our sincere thanks are extended to: Judith Allen, University of Virginia; Michael Arenson, University of Delaware; B. Glenn Chandler, Central Connecticut State College; Herbert Colvin, Baylor University; Charles Fligel, Southern Illinois University; Roger Foltz, University of Nebraska, Omaha; Albert G. Huetteman, University of Massachusetts; William Hussey, University of Texas at Austin; Hanley Jackson, Kansas State University; Marvin Johnson, University of Alabama; Frank Lorince, West Virginia University; William L. Maxson, Eastern Washington University; Leonard Ott, University of Missouri; John Pozdro, University of Kansas; Jeffrey L. Prater, Iowa State University; Russell Riepe, Southwest Texas State University; Wayne Scott, University of Colorado; Richard Soule, University of Nevada; James Stewart, Ohio University; William Toutant, California State University at Northridge; and John D. White, University of Florida.

We are also grateful to those who contributed to the development of the second edition: Richard Bass, University of Connecticut; James Bennighof, Baylor University; Richard Devore, Kent State University; Lora Gingerich, Ohio State University; Kent Kerman, University of Texas at Austin; James W. Krehbiel, Eastern Illinois University; Frank Lorince, West Virginia University (retired); Donald Para, Western Michigan University; Marian Petersen, University of Missouri at Kansas City; Donald Peterson, University of Tennessee; and John Pozdro, University of Kansas.

Contributors to the third edition included Shirley Bean, University of Missouri, Kansas City; Brian Berlin, University of Texas at Austin; Horace Boyer, University of Massachusetts; Polly Brecht, Middle Tennessee State University; John Buccheri, Northwestern University; Arthur Campbell, St. Olaf College; Lisa Derry, Western Michigan University; David Foley, Ball State University; Douglass Green, University of Texas at Austin; Andrew Grobengieser, University of Texas at Austin; Thom Hutcheson, Middle Tennessee State University; Robert Judd, California State University, Fresno; William Pelto, Ithaca College; H. Lee Riggins, Bowling Green State University; Lynne Rogers, University of Texas at Austin; and Judith Solomon, Texas Christian University.

Contributors to the fourth edition included Ron Albrecht, Simpson College; John Benoit, Simpson College; Claire Boge, Miami University; Lisa Derry, Albertson College of Idaho; Allen Feinstein, Northeastern University; Karl Korte, University of Texas at Austin; Jennifer Ottervick, University of South Carolina; Paul Paccione, Western Illinois University; William Pelto, Ithaca College; Timothy Smith, Northern Arizona University; William Schirmer, Jacksonville University; Bob Fleisher, Northern Illinois University; and Judith A. Solomon, Texas Christian University.

A number of graduate students provided assistance in the preparation of the fifth edition, including Sarah Reichardt, Rob Deemer, and Danny Brod, all students at the University of Texas at Austin. Special thanks are due to Reginald Bain, University of South Carolina, who served as editorial consultant for Chapter 28 and who created Appendices B and C.

Contributors to the sixth edition included Bob Fleischer, Northern Illinois University; and Marc Woodridge, Northwestern College. We are especially grateful for the assistance of Reginald Bain, University of South Carolina, who took over the revision of Part Six, "An Introduction to Twentieth-Century Music."

Contributors to the seventh edition included Bruce Atwell, University of Wisconsin, Oshkosh; Ruth Rendleman, Montclair State University; Tobias Rush, University of Northern Colorado; Paul Seitz, University of Missouri; and Amy Williams, University of Pittsburgh. We are particularly grateful to Scott Schumann, University of Texas at Austin, for preparing the glossary. The preparation of the eighth edition was aided by valuable suggestions from George Halsell, College of Southern Idaho, and Jeff Waters, Southwest Baptist University.

The preparation of the ninth edition was aided by Ryan Beavers, who provided the new musical examples, and by Greg Snedecker, recording engineer, both of whom worked on previous editions as well. The authors owe a special debt of gratitude to the late Professor Edward Pearsall, of the University of Texas at Austin, who provided a great many insightful suggestions for improving the book and the workbook. Thanks also to Marc Wooldridge, Indiana Wesleyan University, for his helpful comments. Among the many people at McGraw Hill who were involved in the production of this edition we would like especially to single out Karen Moore, who guided us through the whole process so professionally.

Reviewers who contributed to the development of the ninth edition include Brandon Bascom, Fresno City College; Alexandra Bryant, Gustavus Adolphus College; Bruce Curlette, Cedarville University; Matthew Herman, Western Kentucky University; Ed Jacobs, Southern Illinois College Belleville; Daniel Kazez, Wittenberg University; Michael Lively, Southern Methodist University; William Malone, Pikes Peak Community College; Bradley Martin, California State University Chico; Sarah Masterson, Newberry College; Jonathan Reed, Warner University; John Sanders, Edmonds Community College; Vanessa Sheldon, Mount San Jacinto College; Brian Viliunas, Samford University; and Hsinyi Wang, Tarrant County College NE.

Finally, we would like to express our gratitude to Mary Robertson and Sarah Almén for their love and inspiration, and to our colleagues and students for their continued encouragement.

Stefan Kostka
Byron Almén

To the Student

Harmony in Western Music

One thing that distinguishes Western art music from many other kinds of music is its emphasis on harmony. In other words, just about any piece that you perform will involve more than one person playing or singing different notes at the same time or, in the case of a keyboard player, more than one finger pushing down keys. There are exceptions, of course, such as works for unaccompanied flute, violin, and so on, but even in such pieces an implied harmonic background is often still apparent to the ear.

In general, the music from non-European-American cultures is concerned less with harmony than with other aspects of music. Complexities of rhythm or subtleties of melodic variation, for example, might serve as the focal point in a particular musical culture. Even in Western music, some compositions, such as those for nonpitched percussion instruments, may be said to have little or no harmonic content, but they are the exception.

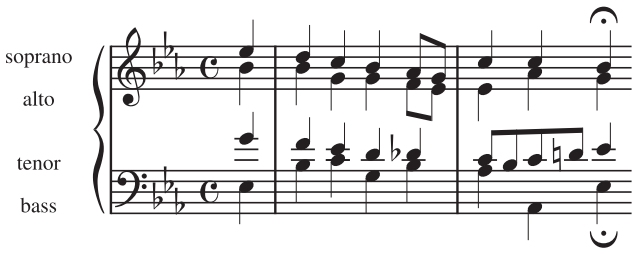
If harmony is so important in Western music, it might be a good idea if we agreed on a definition of it. What does the expression *sing in harmony* mean to you? It probably evokes impressions of something like a barbershop quartet, or a chorus, or maybe just two people singing a song—one singing the melody, the other one singing an accompanying line. Because harmony began historically with vocal music, this is a reasonable way to begin formulating a definition of harmony. In all these examples, our conception of harmony involves more than one person singing at once, and the *harmony* is the sound that the combined voices produce.

> ***Harmony*** *is the sound that results when two or more pitches are performed simultaneously. It is the vertical aspect of music, produced by the combination of the components of the horizontal aspect.*

Although this book deals with harmony and with chords, which are little samples taken out of the harmony, you should remember that musical lines (vocal or instrumental) produce the harmony, not the reverse.

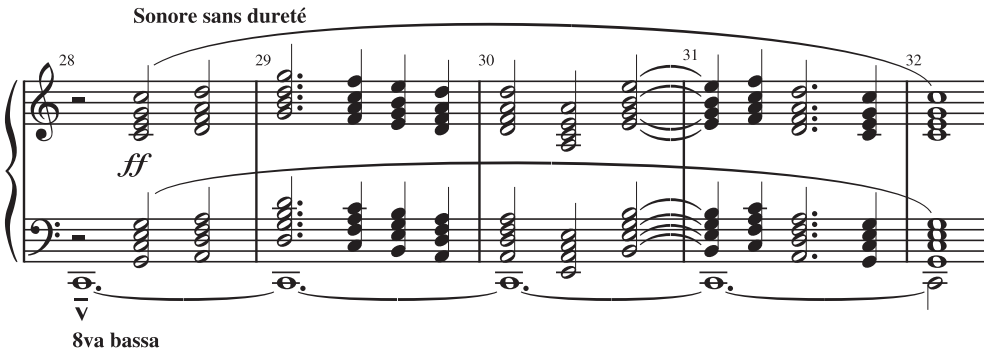
Sing through the four parts in Example 1. The soprano and tenor lines are the most melodic. The actual melody being harmonized is in the soprano, whereas the tenor follows its contour for a while and then ends with an eighth-note figure of its own. The bass line is strong and independent but less melodic, whereas the alto part is probably the least distinctive of all. These four relatively independent lines combine to create harmony, with chords occurring at the rate of approximately one per beat.

nple 1 Bach, "Herzlich lieb hab' ich dich, o Herr"



The relationship between the vertical and horizontal aspects of music is a subtle one, however, and it has fluctuated ever since the beginnings of harmony (about the ninth century). At times, the emphasis has been almost entirely on independent horizontal lines, with little attention paid to the resulting chords—a tendency easily seen in some twentieth-century music. At other times, the independence of the lines has been weakened or is absent entirely. In Example 2, the only independent lines are the sustained bass note and the melody (highest notes). The other lines merely double the melody at various intervals, creating a very nontraditional succession of chords.

nple 2 Debussy, "La Cathédrale engloutie," Preludes, Book I



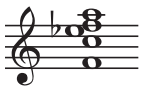
Tonal Harmony Defined

The kind of harmony that this book deals with primarily is usually called **tonal harmony.** The term refers to the harmonic style of music composed during the period from about 1650 to about 1900. This includes such composers as Purcell, Bach, Handel, Haydn, Mozart, Beethoven, Schubert, Schumann, Wagner, Brahms, Tchaikovsky, and all their contemporaries.

Much of today's popular music is based on tonal harmony, just as Bach's music was, which means that both types have a good deal in common. First, both make use of a **tonal**

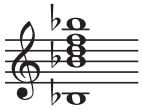
center, a pitch class* that provides a center of gravity. Second, both types of music make use almost exclusively of major and minor scales. Third, both use chords that are tertian in structure. **Tertian** means "built of thirds," so a tertian chord might be C–E–G, a nontertian one C–F–B. Fourth, and very important, is that the chords built on the various scale degrees relate to one another and to the tonal center in fairly complex ways. Because each chord tends to have more or less standard roles, or functions, within a key, this characteristic is sometimes referred to as **functional harmony.** The details of these relationships between chords will be discussed more fully in the text, but to get an idea of what harmonic function is all about, play the chord of Example 3 on the piano.†

nple 3



Play it several times. Arpeggiate it up and down. The "function" of this chord is clear, isn't it? Somehow, you know a lot about this chord without having to read a book about it. Play it again, and listen to where the chord "wants" to go. Then, play Example 4, which seems to follow Example 3 perfectly. This is an example of what is meant by the relationships between chords in tonal harmony and why we sometimes use the term *functional* harmony.

nple 4



Tonal harmony is not limited to the period 1650 to 1900. It began evolving long before 1650, and it is still around today. Turn on your radio, go to a club, listen to the canned music in the supermarket—it's almost all tonal harmony. So why do we put the demise of tonal harmony at 1900? Because from about that time, most composers of "serious," or "legitimate," or "concert" music have been more interested in post-tonal harmony than in tonal harmony. This does not mean that tonal harmony ceased to exist in the real world or in music of artistic merit. Also, it is important to realize that not all music with a tonal center makes use of functional harmony—especially a good deal of the music composed since 1900—music by composers such as Bartók and Hindemith, for example.

* Pitch class: Notes an octave apart or enharmonically equivalent belong to the same pitch class (all C's, B♯'s and D𝄫's, for example). There are 12 pitch classes in all.

† If you cannot arrange to be at a piano while reading this book, try to play through the examples just before or right after reading a particular section or chapter. Reading about music without hearing it is not only dull, it's uninformative.

From our discussion we can formulate this definition of tonal harmony:

> ***Tonal harmony*** *refers to music with a tonal center, based on major and/or minor scales, and using tertian chords that are related to one another and to the tonal center in various ways.*

Using Tonal Harmony

The information in this text is organized in the traditional chapter format, but there are several additional features of which you should be aware.

SELF-TESTS

All chapters contain one or more such sections. These Self-Tests contain questions and drill material for use in independent study or classroom discussion. Suggested answers to all Self-Test problems appear in Appendix D. In many cases, more than one correct answer is possible, but only one answer will be given in Appendix D. If you are in doubt about the correctness of your answer, ask your instructor.

EXERCISES

After each Self-Test section, we refer to a group of Exercises to be found in the Workbook. Most of the Workbook Exercises will be similar to those in the equivalent Self-Test, so refer to the Self-Test if you have questions about how to complete the Exercises. However, the Workbook will also often contain more creative compositional problems than appeared in the Self-Test, because it would be impossible to suggest "answers" to such problems if they were used as Self-Tests.

CHECKPOINTS

You will frequently encounter Checkpoint sections. These are intended to jog your memory and to help you review what you have just read. No answers are given to Checkpoint questions.

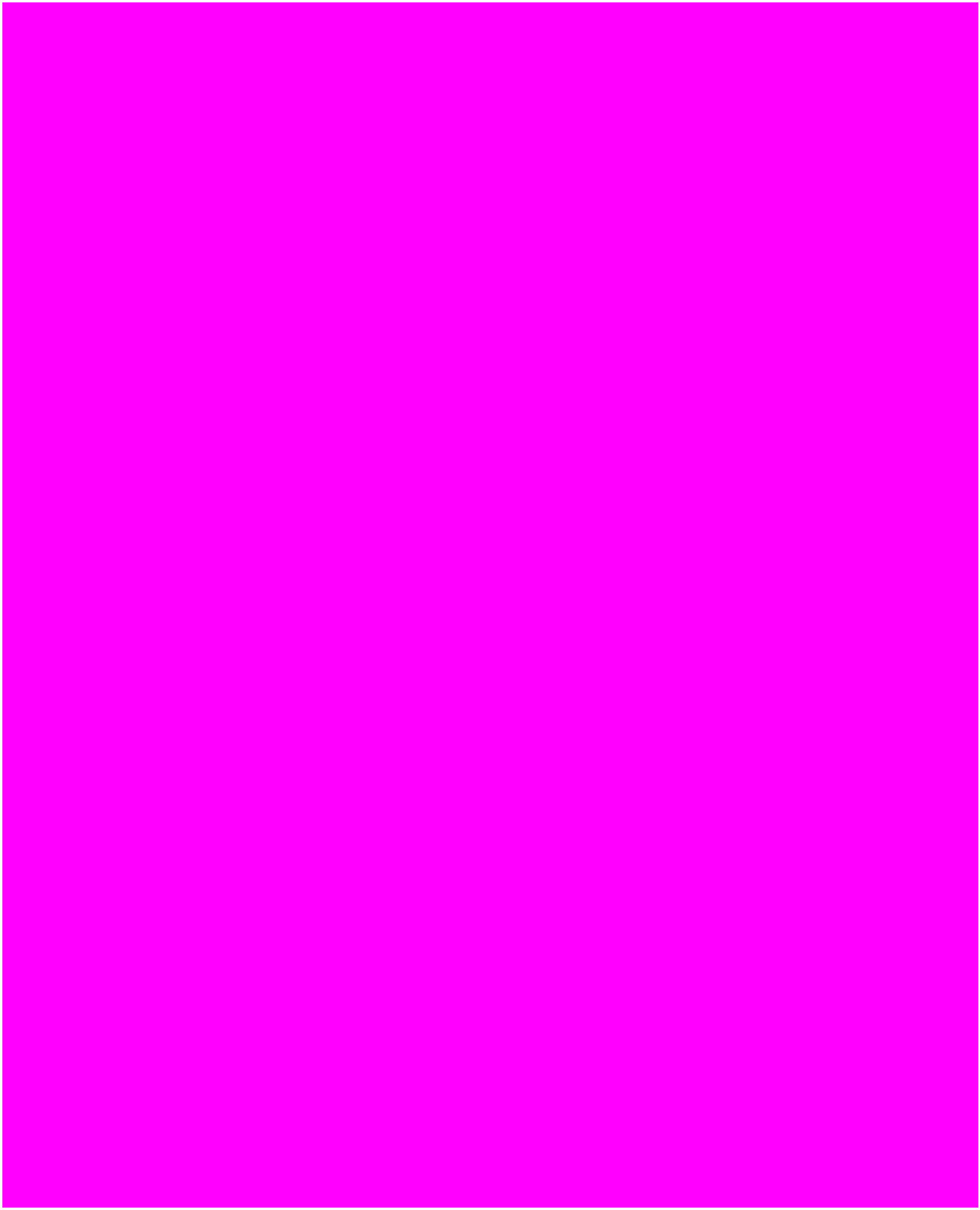
EBOOK RESOURCES

The McGraw Hill ebook for Tonal Harmony offers exercises, drills, and additional reading.

TO CONTACT THE AUTHORS

If you have suggestions for improving future editions of *Tonal Harmony,* please write to the authors at k.a.tonalharmony@gmail.com.

Contents



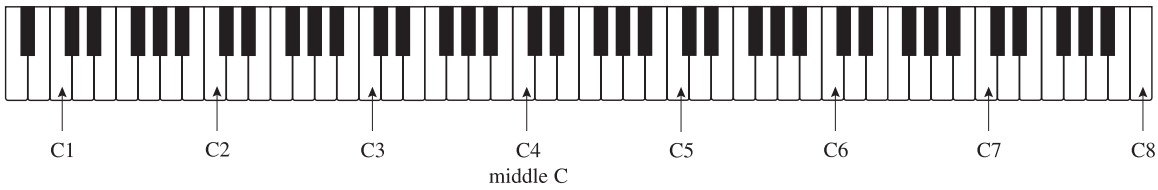
Chapter One

Elements of Pitch

The Keyboard and Octave Registers

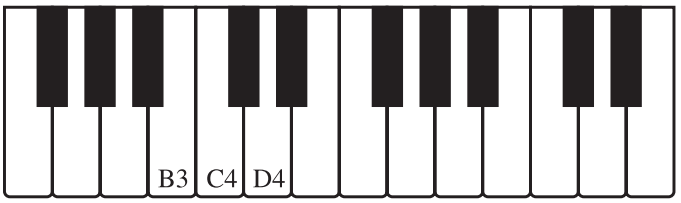
Pitch in music refers to the highness or lowness of a sound. Pitches are named by using the first seven letters of the alphabet: A, B, C, D, E, F, and G. We will approach the notation of pitch by relating this pitch alphabet to the piano keyboard, using Cs as an example. The C nearest to the middle of the keyboard is called middle C, or C4. Higher Cs (moving toward the right on the keyboard) are named C5, C6, and so on. Lower Cs (moving toward the left) are named C3, C2, and C1. Notes below C1 are followed by a 0, as in B0. All the Cs on the piano are labeled in Example 1-1.

nple 1-1



From any C up to or down to the next C is called an **octave.** All the pitches from one C up to, but not including, the next C are said to be in the same **octave register.** As Example 1-2 illustrates, the white key above C4 is named D4 because it is in the same octave register, whereas the white key below C4 is named B3.

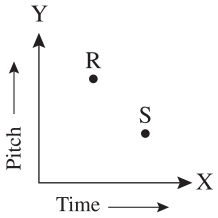
nple 1-2



Notation on the Staff

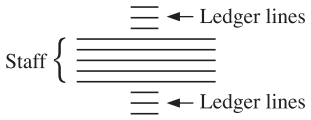
Our system of musical notation is similar to a graph in which time is indicated on the X axis and pitch is shown on the Y axis. In Example 1-3, R occurs before S in time and is higher than S in pitch.

nple 1-3



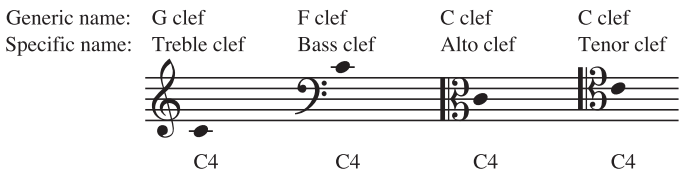
A **staff** is used in music to indicate the precise pitch desired. A staff consists of five lines and four spaces, but it may be extended indefinitely through the use of **ledger lines** (Ex. 1-4).

nple 1-4



A **clef** must appear at the beginning of the staff to indicate which pitches are to be associated with which lines and spaces. The three clefs commonly used today are shown in Example 1-5, and the position of C4 in each is illustrated. Notice that the C clef appears in either of two positions.

nple 1-5

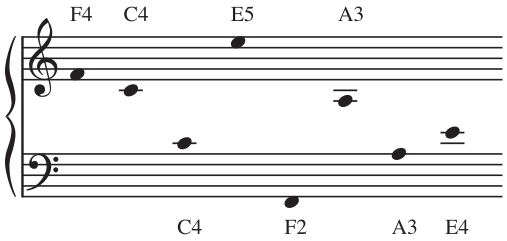


The clefs in Example 1-5 are shown in the positions that are in common use today, but you may occasionally find them placed differently on the staff in some editions. Wherever they appear, the design of the G clef circles G4, the dots of the F clef surround F3, and the C clef is centered on C4.

The **grand staff** is a combination of two staves joined by a brace, with the top and bottom staves using treble and bass clefs, respectively. Various pitches are notated and labeled on the grand staff in Example 1-6. Pay special attention to the way in which the ledger lines are

used on the grand staff. For instance, the notes C4 and A3 appear twice in Example 1-6, once in relation to the top staff and once in relation to the bottom staff.

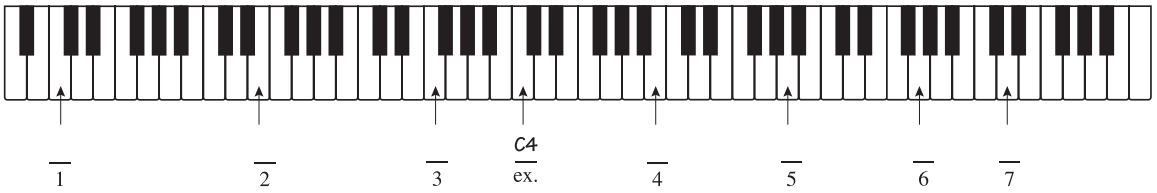
nple 1-6



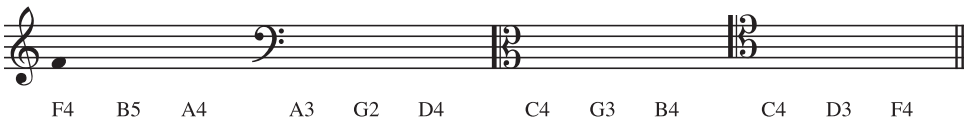
Self-Test 1-1

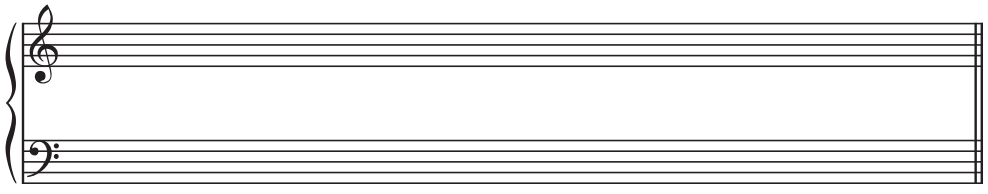
(Answers are in Appendix D.) (p. 563)

A. Name the pitches in the blanks provided, using the correct octave register designations.



B. Notate the indicated pitches on the staff in the correct octave. For the grand staff example, notate each pitch only on the staff on which it best fits.





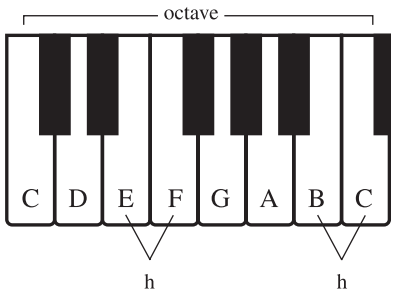
Exercise 1-1 See Workbook.

The Major Scale

In this chapter, you will learn about major and minor scales, the scales that form the basis of tonal music. However, there are many other kinds of scales, some of which are covered in Chapter 26. (p. 463)

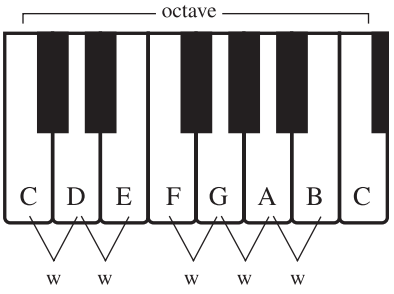
The **major scale** is a specific pattern of small steps (called half steps) and larger ones (called whole steps) encompassing an octave. A **half step** is the distance from a key on the piano to the very next key, white or black. Using only the white keys on the piano keyboard, there are two half steps in each octave, indicated by the letter "h" in Example 1-7.

Example 1-7



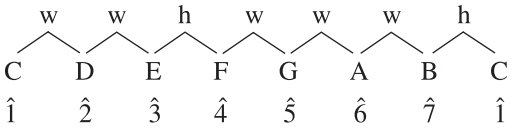
A **whole step** skips the very next key and goes instead to the following one. Using only the white keys on the piano keyboard, there are five whole steps in each octave, indicated by the letter "w" in Example 1-8.

Example 1-8

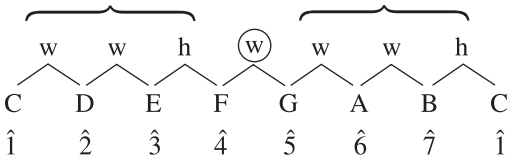


The major-scale pattern of whole and half steps is the same as that found on the white keys from any C up to the next C. In the next diagram, the numbers with carets above them (Î, Ê, etc.) are scale degree numbers for the C major scale.*

* Throughout this book we will refer to major scales with uppercase letters—for example, A major or A—and minor scales with lowercase letters—for example, a minor or a.



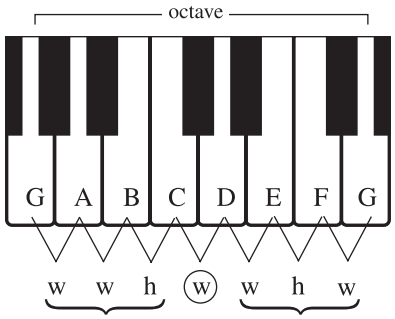
You can see from this diagram that half steps in the major scale occur only between scale degrees $\hat{3}$ and $\hat{4}$ and $\hat{7}$ and $\hat{1}$. Notice also that the major scale can be thought of as two identical four-note patterns separated by a whole step. These four-note patterns are called **tetrachords.**



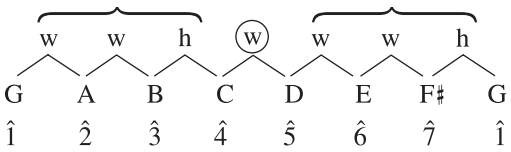
If we examine the steps on the white keys of a G-to-G octave, as in Example 1-9, we do not find the same pattern of whole and half steps that occurred in the C-to-C octave. To play a G major scale, we would need to skip the F key and play the black key that is between F and G. We will label that key with an **accidental,** a symbol that raises or lowers a pitch by a half or whole step. The most commonly used accidentals are listed in the following table.

Symbol	Name	Effect
𝄪	Double sharp	Raise a whole step
♯	Sharp	Raise a half step
♮	Natural	Cancel a previous accidental
♭	Flat	Lower a half step
𝄫	Double flat	Lower a whole step

nple 1-9



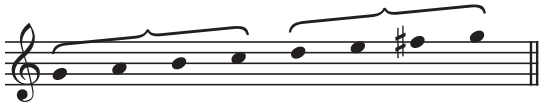
We can make our G scale conform to the major-scale pattern by adding one accidental, in this case a sharp.



It is important to understand that major and minor scales always use all the letter names of the musical alphabet. It would not be correct to substitute a G♭ for the F♯ in a G major scale.

The G major scale is written on the staff in Example 1-10.

Example 1-10

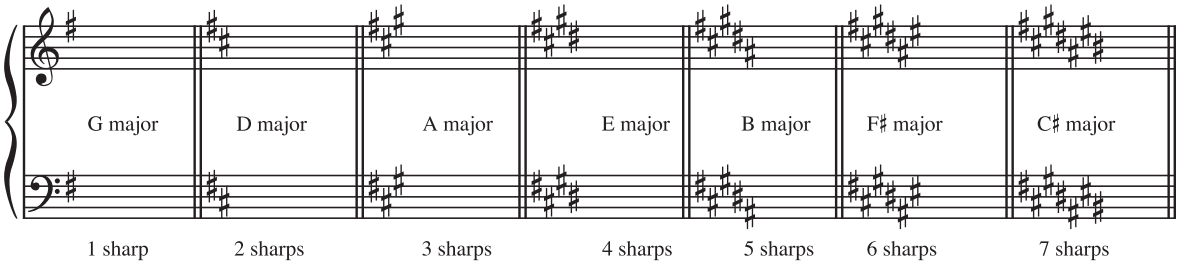


Notice that when we write or say the names of notes and accidentals, we put the accidental last (as in F♯ or F sharp), but in staff notation the accidental always *precedes* the note that it modifies (as in Ex. 1-10).

The Major Key Signatures

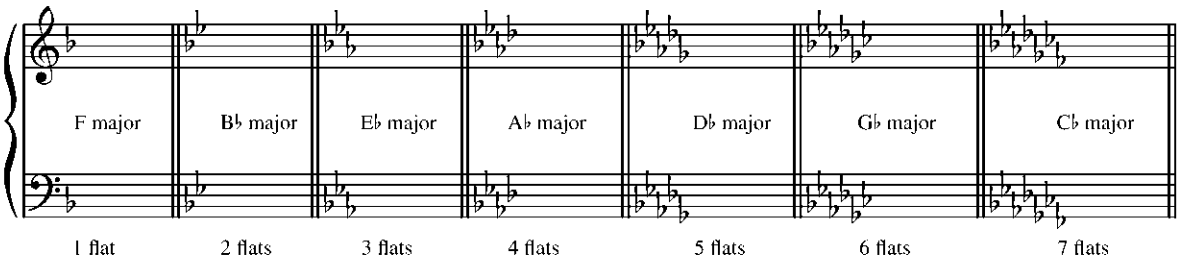
One way to learn the major scales is by means of the pattern of whole and half steps discussed in the previous section. Another is by memorizing the key signatures associated with the various scales. The term **key** is used in music to identify the first degree of a scale. For instance, the key of G major refers to the major scale that begins on G. A **key signature** is a pattern of sharps or flats that appears at the beginning of a staff and indicates that certain notes are to be consistently raised or lowered. There are seven key signatures using sharps. In each case, the name of the major key can be found by going up a half step from the last sharp in the signature (Ex. 1-11).

Example 1-11



There are also seven key signatures using flats. Except for the key of F major, the name of the major key is the same as the name of the next-to-last flat in the signature (Ex. 1-12).

nple 1-12



You may have noticed that there are three pairs of major keys that would sound exactly the same—that is, they would be played on the very same keys of the piano keyboard.

B major = C♭ major

F♯ major = G♭ major

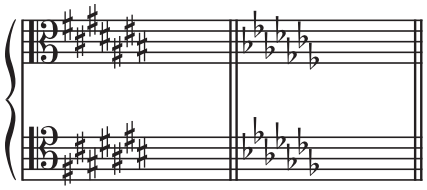
C♯ major = D♭ major

Notes that have the same pitch but that are spelled differently, like E and F♭, are said to be **enharmonic** (or **enharmonically equivalent**). Keys can be enharmonic as well, such as the three pairs of keys shown above. If two major keys are not enharmonic, then they are transpositions of each other. To **transpose** means to write or play music in some key other than the original.

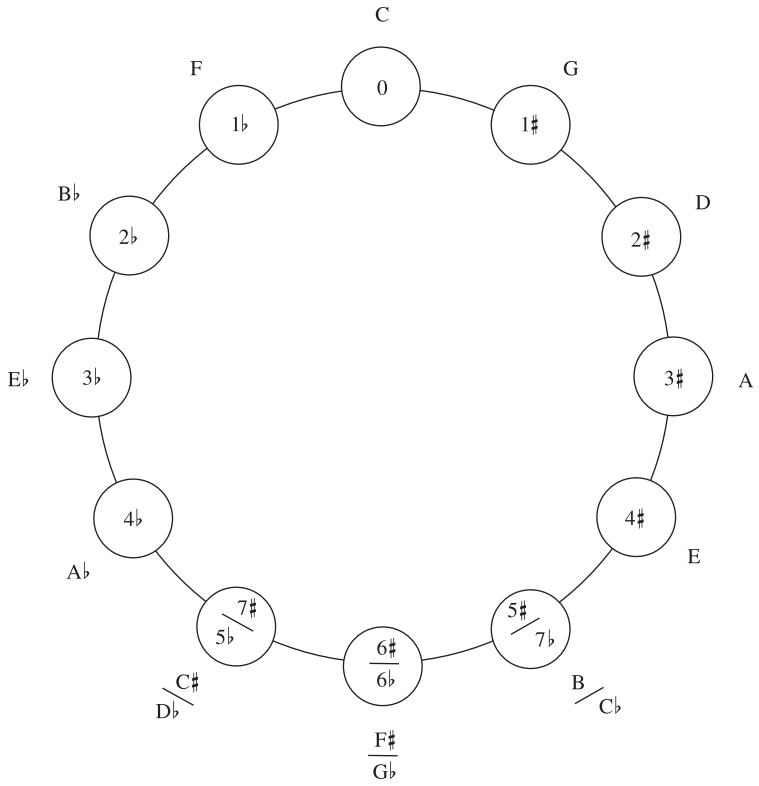
The key signatures in Examples 1-11 and 1-12 must be memorized—not only the number of accidentals involved but also their order and placement on the staff. Notice that the pattern of placing the sharps on the staff changes at the fifth sharp for both the treble and the bass clefs. Try saying aloud the order of accidentals for sharps (FCGDAEB) and for flats (BEADGCF) until you feel confident with them.

Key signatures are written in much the same way using the alto and tenor clefs as they are for treble and bass. The only exception is the placement of sharps in the tenor clef, as you can see in Example 1-13.

nple 1-13



Some people find it easier to memorize key signatures if they visualize a **circle of fifths,** which is a diagram somewhat like the face of a clock. Reading clockwise around the circle of fifths on the following page, you will see that each new key begins on $\hat{5}$ (the fifth scale degree) of the previous key. If you go counterclockwise, each new key begins on $\hat{4}$ of the previous one.

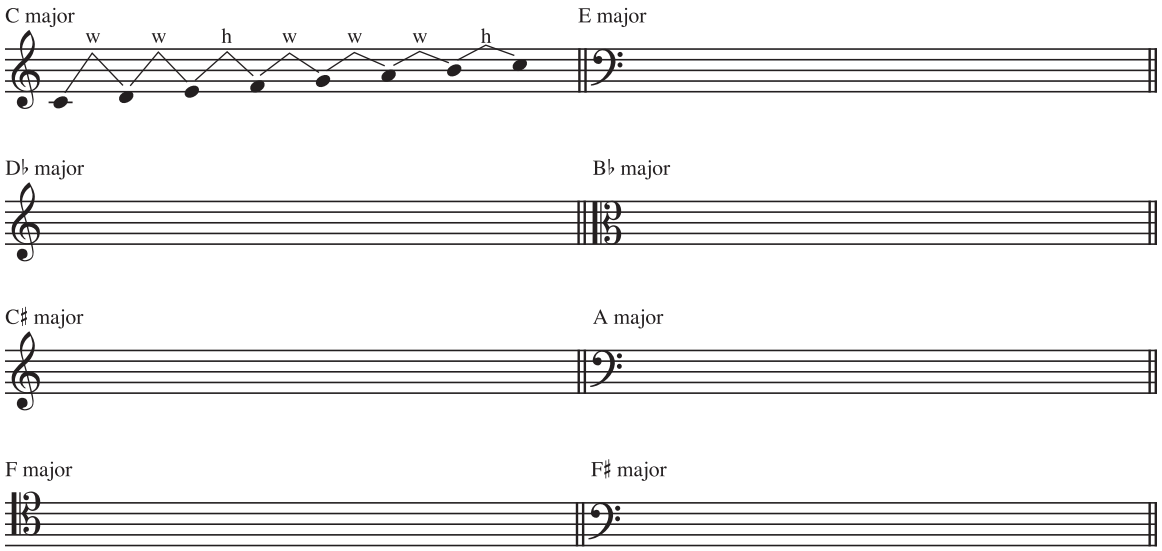


1. Does G3 lie below or above middle C?
2. How is a double sharp notated?
3. Half steps in the major scale occur between scale degrees _____ and _____ as well as between scale degrees _____ and _____ .
4. The major scale consists of two identical four-note patterns called _____ .
5. What relationship can you see between the order of sharps and the order of flats?
6. Name the 15 major keys.

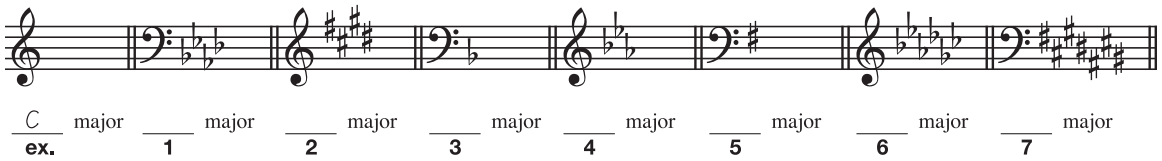
Self-Test 1-2

(Answers appear in Appendix D.) (p. 564)

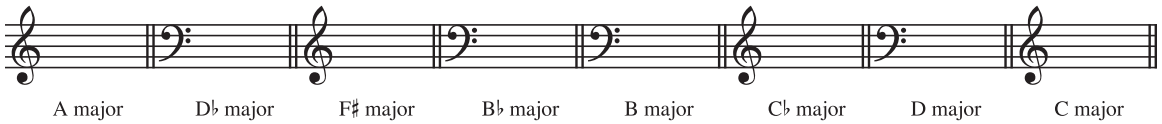
A. Notate the specified scales using accidentals, *not* key signatures. Show the placement of whole and half steps, as in the example.



B. Identify these major key signatures.



C. Notate the specified key signatures.



D. Fill in the blanks.

Key signature	Name of key	Key signature	Name of key
1. Three flats	____ major	8. _____	B♭ major
2. Seven sharps	____ major	9. One sharp	____ major
3. _____	D major	10. Five flats	____ major
4. One flat	____ major	11. _____	F♯ major
5. _____	A♭ major	12. _____	C♭ major
6. _____	B major	13. Four sharps	____ major
7. Six flats	____ major	14. _____	A major

E. Fill in the blanks, using the example as a model.

	Major key	Key signature	Scale degree	Is this note
Ex.	C	0♯/0♭	$\hat{3}$	E
1.			$\hat{2}$	F
2.	D♭		$\hat{5}$	
3.	G			F♯
4.	B		$\hat{3}$	
5.	A♭			F
6.		7♭		F♭

Exercise 1-2 See Workbook.

Minor Scales

Musicians traditionally practice and memorize three minor-scale formations, although these are a simplification of how minor keys actually work, as we will see on p. 55 in Chapter 4. One of these is the **natural minor scale.** You can see from the following illustration that the natural minor scale is like a major scale with lowered $\hat{3}$, $\hat{6}$, and $\hat{7}$.

C major	C	D	E	F	G	A	B	C
Scale degree	$\hat{1}$	$\hat{2}$	$\hat{3}$	$\hat{4}$	$\hat{5}$	$\hat{6}$	$\hat{7}$	$\hat{1}$
c natural minor	C	D	E♭	F	G	A♭	B♭	C

Another minor scale type is the **harmonic minor scale,** which can be thought of as natural minor with a raised $\hat{7}$ or as major with lowered $\hat{3}$ and $\hat{6}$.

C major	C	D	E	F	G	A	B	C
Scale degree	$\hat{1}$	$\hat{2}$	$\hat{3}$	$\hat{4}$	$\hat{5}$	$\hat{6}$	$\hat{7}$	$\hat{1}$
c harmonic minor	C	D	E♭	F	G	A♭	B	C

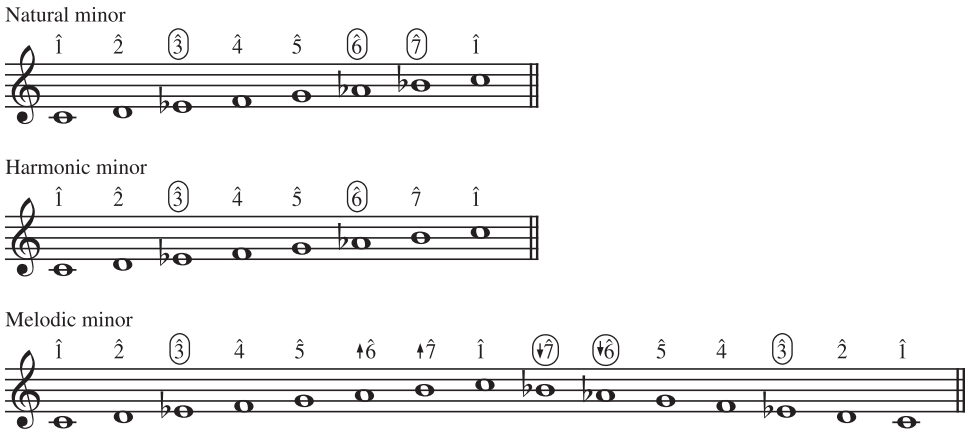
The third type of minor scale is the **melodic minor scale,** which has an ascending form and a descending form. The ascending form, shown next, is like natural minor with a raised $\hat{6}$ and $\hat{7}$ or as major with lowered $\hat{3}$.

C major	C	D	E	F	G	A	B	C
Scale degree	$\hat{1}$	$\hat{2}$	$\hat{3}$	$\hat{4}$	$\hat{5}$	$\hat{6}$	$\hat{7}$	$\hat{1}$
c ascending melodic minor	C	D	E♭	F	G	A	B	C

The descending form of the melodic minor scale is the same as the natural minor scale.

The three minor scale types are summarized in Example 1-14. The scale degrees that differ from the major are circled. Notice the arrows used in the melodic minor scale to distinguish the ascending $\hat{6}$ and $\hat{7}$ from the descending $\hat{6}$ and $\hat{7}$. Also note that scale degrees $\hat{1}$ through $\hat{5}$ are identical in all three forms of the minor scale. This pattern of w–h–w–w is known as the **minor pentachord.**

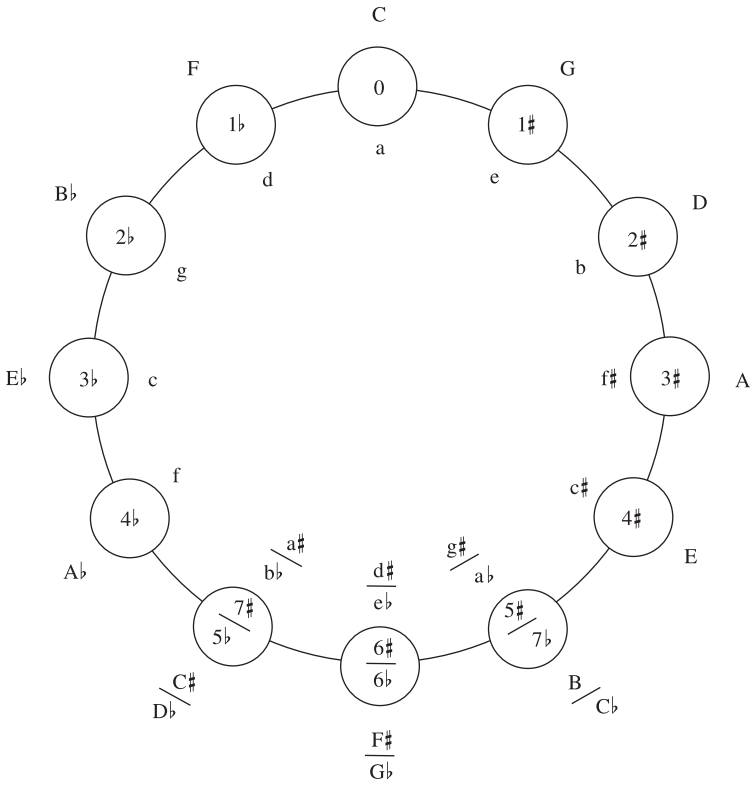
nple 1-14



Minor Key Signatures

Minor key signatures conform to the natural minor scale, no matter which minor scale type is actually in use. Looking back at Example 1-14, you can see that the natural minor scale on C requires three accidentals: B♭, E♭, and A♭. The key signature of c minor, then, is the same as the key signature of E♭ major; c minor and E♭ major are said to be **relative keys** because they share the same key signature. The relative major of any minor key starts on $\hat{3}$ of the minor scale, and the relative minor of any major key begins on $\hat{6}$ of the major scale. If a major scale and a minor scale share the same $\hat{1}$, as do C major and c minor, for example, they are said to be **parallel keys.** We would say that C major is the parallel major of c minor.

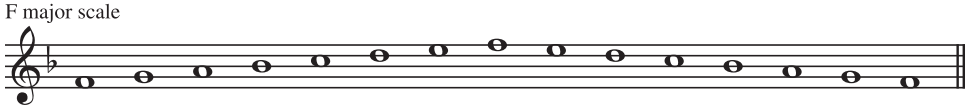
The circle of fifths is a convenient way to display the names of the minor keys and their relative majors, as well as their key signatures. In the following diagram, the names of the minor keys (in lowercase, as usual) are inside the diagram.



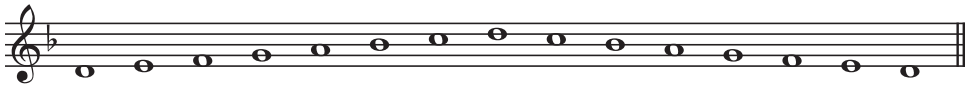
You may find it easier to learn the minor scales in terms of their relative majors, as in the preceding circle-of-fifths diagram, instead of in terms of their parallel majors, which is how minor scales were introduced. This will be most helpful regarding the keys of g♯, d♯, and a♯, which have no parallel major forms. If you do use the relative major approach, remember that the key signature for any minor scale conforms to the *natural* minor scale and that accidentals must be used to spell the other forms. Specifically, you have to raise $\hat{7}$ of the natural minor scale to produce the harmonic minor scale and raise $\hat{6}$ and $\hat{7}$ of the natural minor scale to get the ascending form of the melodic minor scale. Example 1-15 illustrates the spellings for the related keys of F major and d minor.

nple 1-15

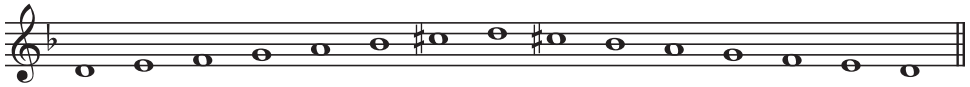
F major scale



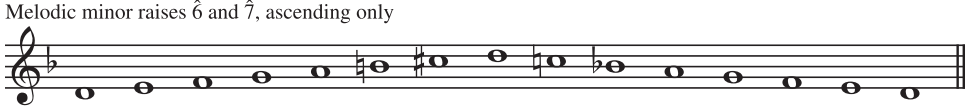
Relative minor, natural form



Harmonic minor raises $\hat{7}$



Melodic minor raises $\hat{6}$ and $\hat{7}$, ascending only



One final hint: A quick way to find any minor key signature other than g♯, d♯, or a♯ is to begin with the key signature of the *parallel* major and to add three flats and/or subtract three sharps. Examples:

Major key		Minor key	
B♭	2 flats	b♭	5 flats
E	4 sharps	e	1 sharp
D	2 sharps	d	1 flat

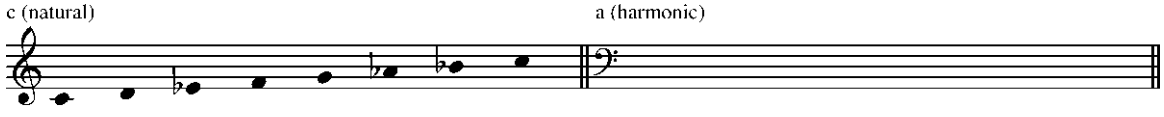
The very best way to learn scales is by practicing them on an instrument. If you do this enough, muscle memory will take you from one note to the next without having to think about it. This will pay off not only in your study of music theory, but also in your activities as a performing musician.

Self-Test 1-3

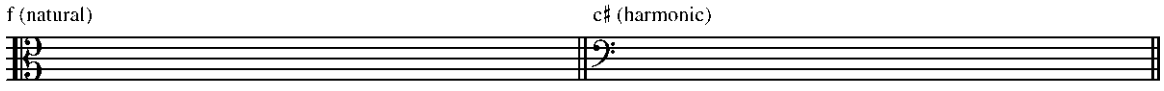
(Answers appear in Appendix D.) (p. 565)

A. Notate the specified scales using accidentals, *not* key signatures. The melodic minor should be written both ascending and descending.

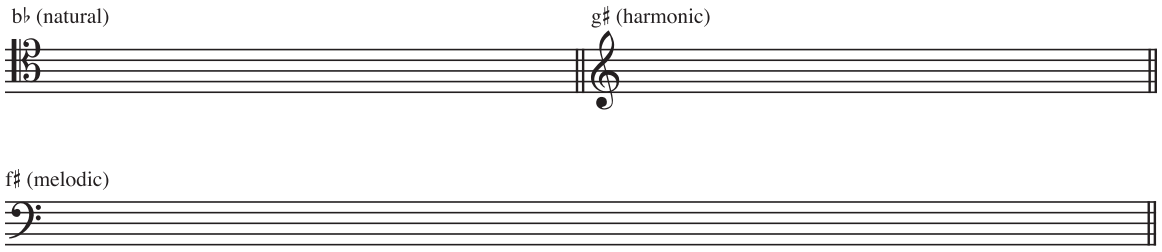
c (natural) a (harmonic)



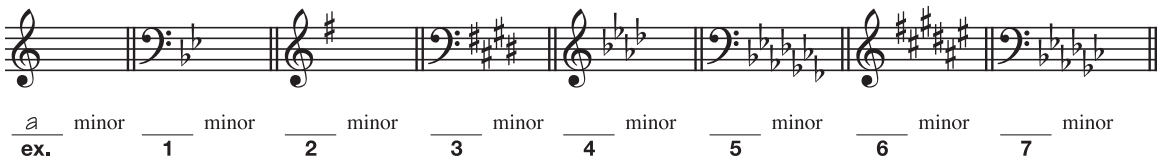
f (natural) c♯ (harmonic)



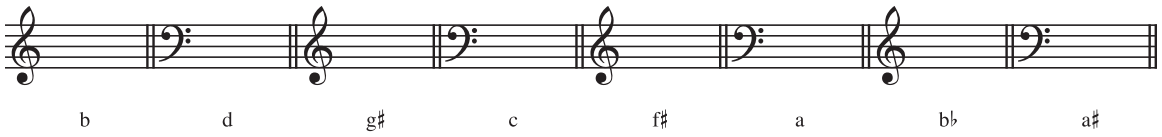
e♭ (melodic)



B. Identify these minor key signatures.



C. Notate the specified minor key signatures.



D. Fill in the blanks.

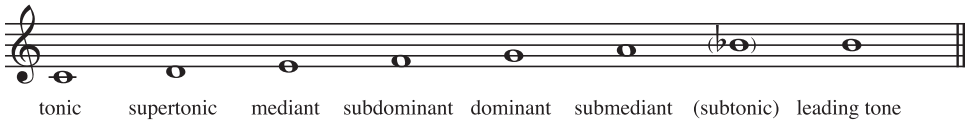
Key signature	Name of key	Key signature	Name of key
1. _____	d minor	8. Two flats	____ minor
2. Six flats	____ minor	9. _____	f minor
3. Four sharps	____ minor	10. _____	b minor
4. _____	f♯ minor	11. Three flats	____ minor
5. Six sharps	____ minor	12. _____	a♭ minor
6. _____	b♭ minor	13. One sharp	____ minor
7. _____	a♯ minor	14. Five sharps	____ minor

Exercise 1-3 See Workbook.

Scale Degree Names

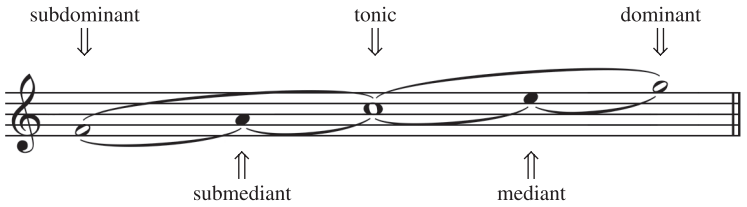
Musicians in conversation or in writing often refer to scale degrees by a set of traditional names rather than by numbers. The names are shown in Example 1-16. Notice that there are two names for $\hat{7}$ in minor, depending on whether or not it is raised.

Example 1-16



The origin of some of these names is illustrated in the key of C major in Example 1-17. Notice that the mediant lies halfway between the tonic and the dominant, while the submediant lies halfway between the tonic and the subdominant.

Example 1-17



Now is the time to start learning the scale degree names, if you do not know them already. Here are a couple of exercises that will help.

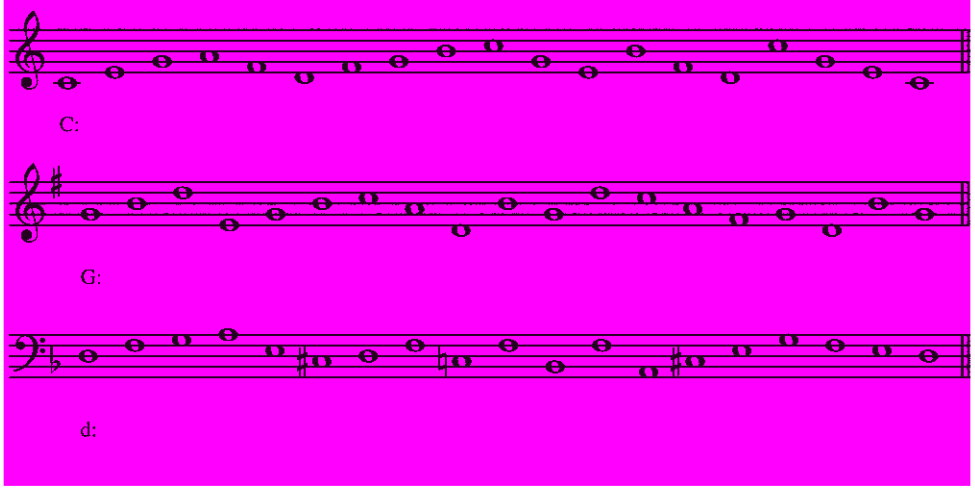
1. Translate these numbers aloud to scale degree names as fast as possible. Repeat as often as necessary until speed is attained.

   $\hat{1}\ \hat{2}\ \hat{3}\ \hat{4}\ \hat{5}\ \hat{6}\ \hat{7}\ \hat{1}\ \hat{7}\ \hat{6}\ \hat{5}\ \hat{4}\ \hat{3}\ \hat{2}\ \hat{1}$

   $\hat{3}\ \hat{5}\ \hat{7}\ \hat{6}\ \hat{4}\ \hat{2}\ \hat{1}\ \hat{6}\ \hat{3}\ \hat{7}\ \hat{2}\ \hat{5}\ \hat{4}\ \hat{3}\ \hat{1}$

   $\hat{5}\ \hat{2}\ \hat{7}\ \hat{4}\ \hat{6}\ \hat{3}\ \hat{1}\ \hat{2}\ \hat{7}\ \hat{5}\ \hat{6}\ \hat{4}\ \hat{1}\ \hat{3}\ \hat{2}$

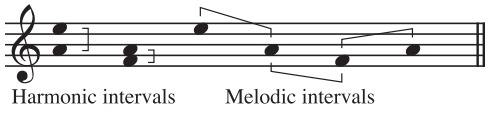
2. Call out or sing the scale degree names contained in each example that follows.



Intervals

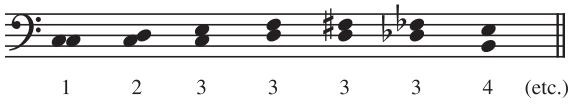
An **interval** is the measurement of the distance in pitch between two notes. A **harmonic interval** results when the notes are performed at the same time, whereas a **melodic interval** occurs when the notes are played successively (Ex. 1-18). The method of measuring intervals is the same for both harmonic and melodic intervals.

nple 1-18



There are two parts to any interval name: the numerical name and the modifier that precedes the numerical name. As Example 1-19 illustrates, the numerical name is a measurement of how far apart the notes are vertically on the staff, regardless of what accidentals are involved.

nple 1-19



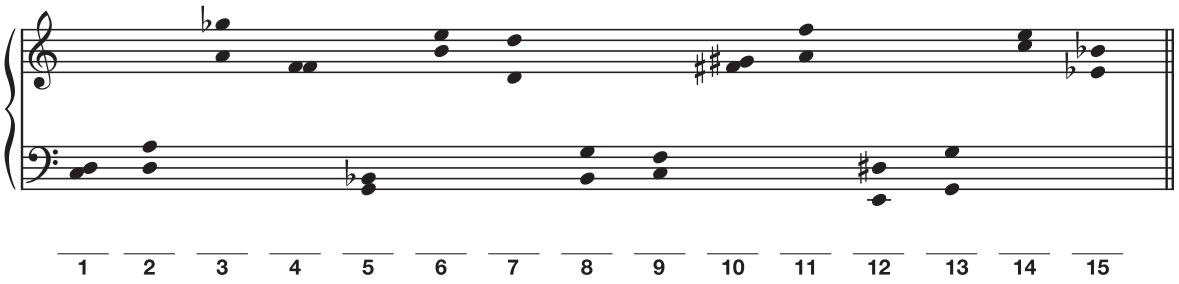
In talking about intervals, we use the terms **unison** instead of 1, and **octave** (8ve) instead of 8. We also say 2nd instead of "two," 3rd instead of "three," and so on. Intervals smaller than an 8ve are called **simple intervals,** whereas larger intervals (including the 8ve) are called **compound intervals.**

It is important to notice in Example 1-19 that the harmonic interval of a 2nd is notated with the top note offset a little to the right of the bottom note. Accidentals are offset in the same way for harmonic intervals of a 2nd, 3rd, 4th, or 5th, if both notes require an accidental.

Self-Test 1-4

(Answers appear in Appendix D.) (p. 566)

Provide the numerical names of the intervals by using the numbers 1 through 8.



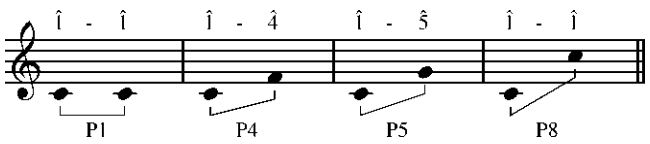
Exercise 1-4 See Workbook.

Perfect, Major, and Minor Intervals

One way to begin learning the modifiers for intervals is by relating them to the intervals contained in the major scale, specifically the intervals from Î up to the other scale degrees. This method can then be applied in any context, whether or not the major scale is actually being used.

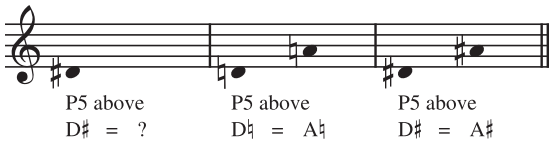
The term **perfect** (abbreviated P) is a modifier used only in connection with unisons, 4ths, 5ths, 8ves, and their compounds (11ths, and so on). As Example 1-20 illustrates, a P1, P4, P5, and P8 can all be constructed by using Î in the major scale as the *bottom* note.

nple 1-20



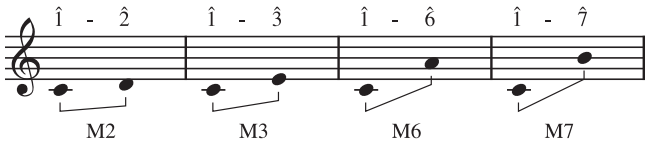
If we want to spell one of these intervals above E♭, for example, we need only to think of scale steps $\hat{1}$, $\hat{4}$, and $\hat{5}$ of the E♭ major scale. If the bottom note does not commonly serve as $\hat{1}$ of a major scale (such as D♯), remove the accidental temporarily, spell the interval, and then apply the accidental to both notes (Ex. 1-21).

Example 1-21



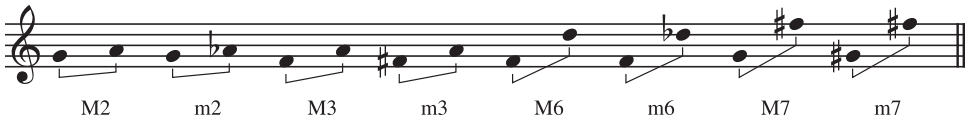
The modifiers **major** and **minor** (abbreviated as M and m) are used only in connection with 2nds, 3rds, 6ths, 7ths, and their compounds (9ths, and so on). The intervals formed by $\hat{1}$–$\hat{2}$, $\hat{1}$–$\hat{3}$, $\hat{1}$–$\hat{6}$, and $\hat{1}$–$\hat{7}$ in the major scale are all major intervals, as Example 1-22 illustrates.

Example 1-22



If a major interval is made a half step smaller without altering its numerical name, it becomes a minor interval (Ex. 1-23). Notice that you can make an interval smaller by lowering the top note or raising the bottom note.

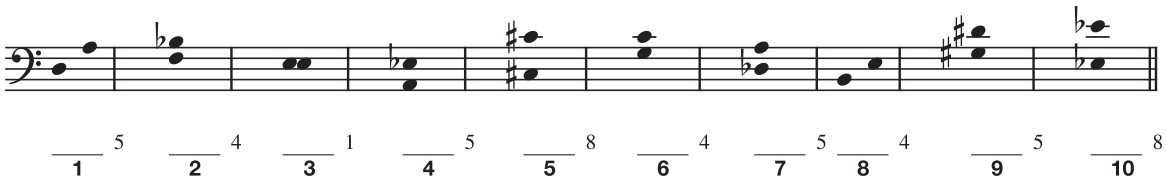
Example 1-23



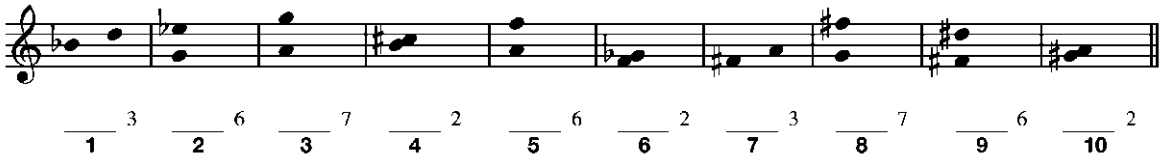
Self-Test 1-5

(Answers appear in Appendix D.) (p. 566)

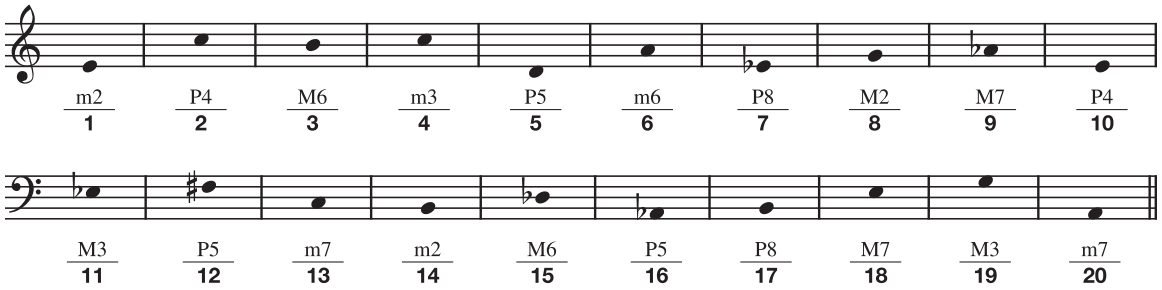
A. All the intervals that follow are unisons, 4ths, 5ths, or 8ves. Put "P" in the space provided *only* if the interval is a perfect interval.



B. All the intervals that follow are 2nds, 3rds, 6ths, or 7ths. Write "M" or "m" in each space, as appropriate.



C. Notate the specified intervals above the given notes.



Exercise 1-5 See Workbook.

Augmented and Diminished Intervals

If a perfect or a major interval is made a half step larger without changing the numerical name, the interval becomes **augmented** (abbreviated +). If a perfect or a minor interval is made a half step smaller without changing its numerical name, it becomes **diminished** (abbreviated °). These relationships are summarized as follows:

[larger] →

diminished ↔ minor ↔ major ↔ augmented

diminished ↔ perfect ↔ augumented

← [smaller]

There is no such thing as a diminished unison. Doubly augmented and doubly diminished intervals are possible, but they seldom occur. **Tritone** is a term used for the +4 or its enharmonic equivalent, the °5.

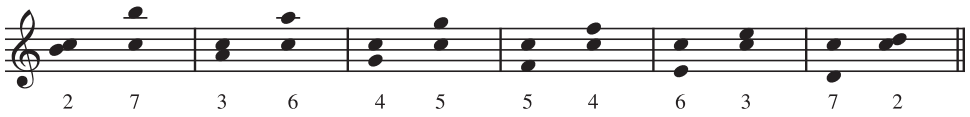
Inversion of Intervals

Descending intervals, especially large ones, are often easier to spell and identify through the use of **interval inversion.** We invert an interval by putting the bottom pitch above the top one or the reverse; for example, the interval D up to A inverts to A up to D. When we invert an interval, the new numerical name is always different from the old one. The new numerical name can be calculated by subtracting the old numerical name from 9.

Constant value of	9	9	9	9	9	9
Minus old numeric name	−2	−3	−4	−5	−6	−7
Equals new numeric name	7	6	5	4	3	2

You can see that an inverted 2nd becomes a 7th, a 3rd becomes a 6th, and so on (Ex. 1-24).

nple 1-24

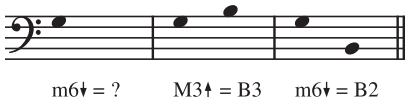


The modifier also changes when an interval is inverted, with the exception of perfect intervals.

Old modifier	m	M	P	+	°
New modifier	M	m	P	°	+

As an example of the usefulness of inversion, suppose you wanted to know what note lies a m6 below G3. Invert the m6 down to a M3 up, as in Example 1-25, transpose the B3 down an 8ve, and you find that the answer is B2.

nple 1-25



Fluency with intervals, as with scales, is necessary for any serious musician and will provide a solid foundation for your further study. As you did with scales, you will benefit from finding out how various intervals sound and feel on a musical instrument.

One exercise you can do (you can think of others) is to write out the notes of the chromatic scale in random order. Include each black key twice—once as a sharped note and once as a flatted note. Then play some interval above and below each note. Work for speed, using your ear to correct yourself.

Consonant and Dissonant Harmonic Intervals

In tonal music, some harmonic intervals are considered to be consonant, whereas others are considered to be dissonant. The terms **consonant** and **dissonant** can be defined roughly as meaning pleasing to the ear and not pleasing to the ear, respectively, but these are very dependent on context. Some of the most exciting moments in tonal music involve dissonance, which is certainly not displeasing in that context, but the dissonances resolve eventually to the consonances that give them meaning. As you can imagine, this is a complex subject, and it is one with which much of this book is concerned.

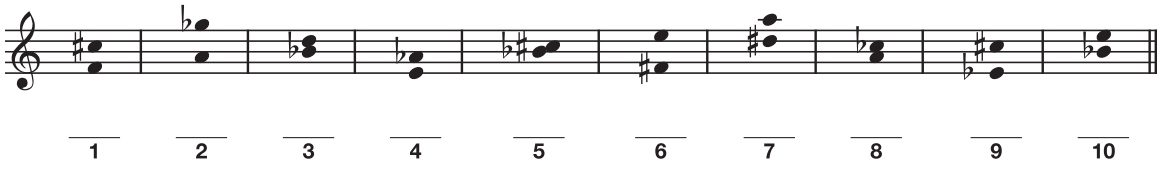
For now, it will suffice to say that major and minor 3rds and 6ths and perfect 5ths and 8ves are consonant. All other harmonic intervals, including all augmented and diminished intervals, are dissonant. An exception is the P4, which is considered dissonant in tonal music only when it occurs above the lowest voice (also called the **bass,** in both vocal and instrumental music).

1. What is the term for an interval in which the notes are played in succession instead of simultaneously?
2. Is there such a thing as a m5? A P6?
3. A perfect interval made a half step smaller without changing its numerical name becomes _____ .
4. A °5 inverted becomes a _____ .
5. Intervals that are relatively displeasing to the ear are classified as _____ .

Self-Test 1-6

(Answers appear in Appendix D.) (p. 566)

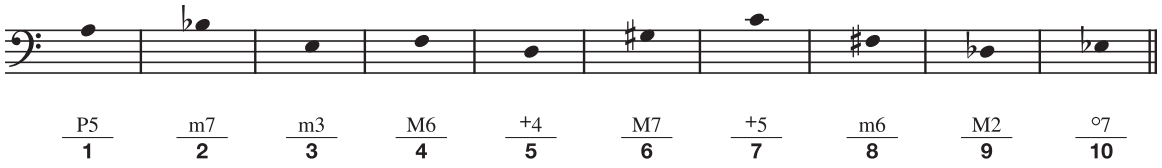
A. Most of the following intervals are either augmented or diminished. Label each interval.



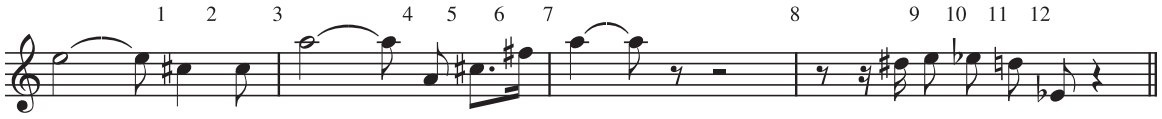
B. Label what each interval becomes when it is inverted.

1. P4 becomes _____
2. M7 becomes _____
3. +2 becomes _____
4. M3 becomes _____
5. °5 becomes _____
6. m2 becomes _____
7. m6 becomes _____
8. +6 becomes _____

C. Notate the specified interval *below* the given note. (You may find it helpful to invert the interval first in some cases.) Do not change or add an accidental to the given note.



D. Label each interval in this melody (from Wagner's *Götterdämmerung*). Interval 8 is from the A5 down to the D♯5. Remember that an accidental remains in effect until the end of the measure, unless it is canceled.



E. Beneath each of the following harmonic intervals, indicate whether it is consonant ("c"), dissonant ("d"), or dissonant only if the bass has the bottom note of the interval ("d bass").

	1. m7	2. P1	3. P8	4. °7	5. m6
c					
d					
d bass					

	6. M2	7. P5	8. M3	9. +2	10. P4
c					
d					
d bass					

Exercise 1-6 See Workbook.

Summary

Pitch in music refers to the highness or lowness of a sound. Particular pitches are named by using the musical alphabet, consisting of the letters A through G, at which point the alphabet starts over. From one letter up or down to its next occurrence is called an **octave,** whereas the space from any C up to the next B is called an **octave register.** Octave registers are numbered, with the lowest C on the piano keyboard designated as C1. The C nearest the middle of the piano keyboard is called middle C, or C4.

Pitches are notated on the **staff,** an arrangement of five lines and four spaces that can be extended through the use of **ledger lines.** A staff always begins with one of several **clefs,** which determine exactly what pitch is represented by each line or space. A **grand staff** consists of two staves joined by a brace, with a treble clef on the top staff and a bass clef on the bottom.

The **major scale** consists of two identical tetrachords that have a particular arrangement of **whole steps** and **half steps.** Most major scales also have a parallel minor scale that begins on the same note but that lowers scale degrees $\hat{3}$, $\hat{6}$, and $\hat{7}$ by a half step. This form of the minor is called the **natural minor scale.** The **harmonic minor scale** lowers only scale degrees $\hat{3}$ and $\hat{6}$ of its parallel major, whereas the **melodic minor scale** lowers only scale degree $\hat{3}$ when ascending and scale degrees $\hat{7}$, $\hat{6}$, and $\hat{3}$ when descending.

Every scale has an associated **key signature,** consisting of zero to seven sharps or flats arranged in a particular way on the staff. There are 15 key signatures in all, with one major and one minor scale associated with each. Major and minor keys that share the same key signature are said to be **relative keys,** whereas those that share the same starting note are called **parallel keys.** The notes of a scale are all assigned scale degree names, which vary only slightly between major and minor. **Enharmonic** notes or keys sound the same but are spelled differently. To **transpose** music means to play it in another key.

The difference between any two pitches is called an **interval.** A **harmonic interval** separates pitches that are sounded simultaneously, whereas a **melodic interval** separates pitches that are sounded in succession. Intervals are defined by means of a numerical name and a modifier that precedes it. These modifiers include the terms **perfect, major, minor, augmented,** and **diminished.** To invert an interval, put the lower note above the upper one (or the reverse). The numerical name and modifier of an inverted interval can be predicted using the method explained in this chapter.

Consonant intervals include major and minor 3rds and 6ths, the P5, and the P8. The P4 is usually consonant, unless it occurs above the lowest voice.

Dissonant intervals include 2nds, 7ths, all diminished or augmented intervals. and the P4 when it occurs above the lowest voice.

Chapter Two

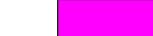
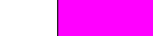
Elements of Rhythm

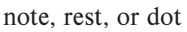
Rhythm

This chapter concerns the time aspect of music—how sounds are notated so that they will occur at a predictable moment and in a predetermined pattern. **Rhythm** is a general term used to refer to the time aspect of music, as contrasted with the pitch aspect.

Durational Symbols

Durations are notated by using symbols that are organized so that each symbol is twice the duration of the next shorter symbol and half the duration of the next longer symbol. The following table lists a number of these symbols.

Value	Note	Rest
Breve		
Whole		
Half		
Quarter		
Eighth		
Sixteenth		

The same series could be continued to thirty-seconds, sixty-fourths, and so on. Durations other than these must be indicated through the use of ties, dots, or other symbols. A **tie** is a curved line that connects two notes of the same pitch, creating a new duration that is equal to their sum. A **dot** following a symbol always adds to the duration one-half the value of the note, rest, or dot that precedes it, for example  and  . When notated on the staff, a dot is never placed on a staff line. If the notehead itself is on a staff line, the dot is put to the right of the note but in the space *above* it.

Beat and Tempo

The **beat** is the basic pulse of a musical passage. To determine the beat of a passage you are listening to, tap your foot to the music, or try to imagine the way a conductor would conduct the passage—the conductor's arm movement. The resulting steady pulse is called the beat, and the rate at which the beats occur is called the **tempo.**

A composer commonly specifies the tempo of a passage by one of two methods—sometimes by both. The first method uses words, often in Italian, to describe the tempo—words such as adagio, moderato, and allegro.

The second method is more exact because it shows precisely how many beats are to occur in the space of one minute. For example, if the desired tempo would result in 72 quarter notes in one minute, the tempo indication would be ♩ = 72 or M.M. ♩ = 72. The M.M. stands for Maelzel's metronome, after Johann Maelzel, who widely promoted the device during the early nineteenth century.

Meter

Beats tend to be grouped into patterns that are consistent throughout a passage; the pattern of beats is called the **meter**. Groups of two, three, and four beats are the most common, although other meters occur. Incidentally, a group of four beats could often also be interpreted as two groups of two beats each and vice versa. In any case, the groups of beats are called **measures** (abbreviated m. or mm.), and in notation the end of a measure is always indicated by a vertical line through the staff called a **bar line.** (A bar line also cancels any accidentals that appeared in the measure.) The words **duple, triple, and quadruple** are used to refer to the number of beats in each measure, as in **duple meter, triple meter,** and **quadruple meter.** These terms are summarized in the following table, along with the pattern of stresses usually found in each meter (referred to as **metric accent**).

Grouping	Meter type	Metric accent pattern
Two-beat measure	Duple	Strong, weak
Three-beat measure	Triple	Strong, weak, weak
Four-beat measure	Quadruple	Strong, weak, less strong, weak

As you might imagine, most marches are in duple meter because people have two feet, whereas contemporary popular music tends to be in duple or quadruple meter. Waltzes are always in triple meter, as are a number of traditional songs, such as "Amazing Grace" and "Scarborough Fair."

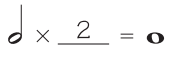
The meter of many passages is clear and easily identified, but in other cases the meter might be ambiguous. For example, sing "Take Me Out to the Ball Game" quite slowly while you tap your foot or conduct, then decide on the meter type. Now sing it again, but very fast. The first time you probably felt the meter was triple, but at a faster tempo you should have identified the meter as duple (or quadruple). Between those extreme tempos are more moderate tempos, which two listeners might interpret in different ways—one hearing a faster triple meter, the other a slower duple meter. Both listeners would be correct because identifying meter in a case such as this is a matter of interpretation rather than of right and wrong.

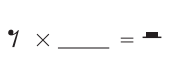
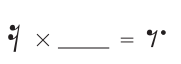
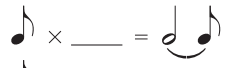
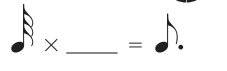
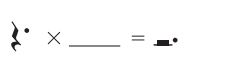
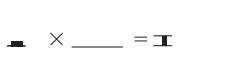
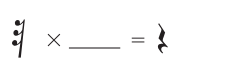
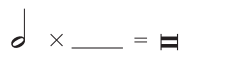
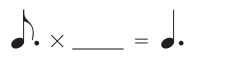
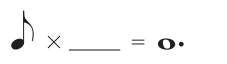
We use the term **hypermeter** to refer to a regular grouping of measures that is analogous to meter. Sing through "Amazing Grace," which is in triple meter, and notice how the measures form groups of four, creating a quadruple hypermeter.

Self-Test 2-1

(Answers appear in Appendix D.) (p. 567)

A. Show how many notes or rests of the shorter duration would be required to equal the longer duration.

ex.  2

1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 
9. 
10. 
11. 
12. 
13. 
14. 
15. 
16. 

B. Sing aloud each of the songs listed below. Then identify the meter type of each, using the terms *duple, triple,* and *quadruple.*

1. "Silent Night" (slow tempo) _____
2. "Jingle Bells" _____
3. "America the Beautiful" _____
4. "For He's a Jolly Good Fellow" _____
5. "Home on the Range" _____

C. Scale review. Given the key and the scale degree, supply the note name. Assume the *melodic minor* form for each minor key.

ex. f♯ $\hat{4}$ B

1. D♭: $\hat{6}$ _____
2. f: $\hat{3}$ _____
3. A: $\hat{5}$ _____
4. B: $\hat{3}$ _____
5. g: $\uparrow\hat{6}$ _____
6. c♯: $\downarrow\hat{7}$ _____
7. E♭: $\hat{5}$ _____
8. B♭ $\hat{4}$ _____
9. c: $\downarrow\hat{6}$ _____
10. e: $\hat{4}$ _____
11. A♭: $\hat{7}$ _____
12. F♯ $\hat{2}$ _____
13. b♭: $\hat{5}$ _____
14. E: $\hat{6}$ _____
15. d: $\uparrow\hat{7}$ _____

Exercise 2-1 See Workbook.

Division of the Beat

In most musical passages, we hear durations that are shorter than the beat. We call these shorter durations **divisions of the beat.** Beats generally divide either into two equal parts, called **simple beat,** or into three equal parts, called **compound beat.** Be careful not to confuse beat type, which refers to how the **beat** divides (simple or compound), with meter type, which refers to how the **measure** divides (duple, triple, or quadruple). The common beat and meter types can be combined with each other in six possible ways.

	METER		
BEAT	**Duple**	**Triple**	**Quadruple**
Simple	Simple duple	Simple triple	Simple quadruple
Compound	Compound duple	Compound triple	Compound quadruple

For example, sing "Take Me Out to the Ball Game" quickly in duple meter, as you did in the discussion of **meter** (p. 25). You can hear that the beats divide into thirds, so this is an example of compound duple. Do the same with "Old MacDonald Had a Farm" or "Around Her Neck She Wore a Yellow Ribbon," and you will find that both are simple duple (or simple quadruple).

1. How many 16th notes are in a half note?
2. Two dots following a quarter note add what durations to it?
3. What term refers to the ways in which beats divide?

Self-Test 2-2

(Answers appear in Appendix D.) (p. 567)

Sing aloud each of the following songs. Then identify the beat and meter types of each, using terms such as *simple duple* and so on.

1. "Auld Lang Syne" _____ _____
2. "Pop Goes the Weasel" _____ _____
3. "Silent Night" _____ _____
4. "Jingle Bells" _____ _____
5. "For He's a Jolly Good Fellow" _____ _____

Simple Time Signatures

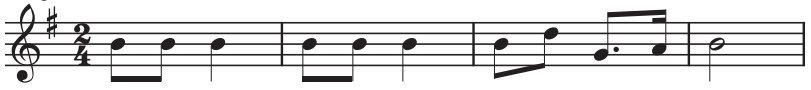
A **time signature** is a symbol that tells the performer how many beats will occur in each measure, what note value will represent the beat, and whether the beat is simple or compound. A time signature for a simple beat has 2, 3, or 4 as the top number. The top number indicates the number of beats in the measure; the bottom number indicates the beat note (2 = 𝅗𝅥, 4 = ♩, 8 = ♪, and so on). Some typical simple time signatures are listed in the following table. Notice that time signatures are not written as fractions—there should be no line between the numbers.

Time signature	Beats per measure	Beat note	Division of the beat
$\frac{2}{4}$	2	♩	♫
$\frac{2}{2}$ or ¢	2	𝅗𝅥	♩ ♩
$\frac{3}{16}$	3	♪	𝅘𝅥𝅯𝅘𝅥𝅯
$\frac{3}{4}$	3	♩	♫
$\frac{4}{8}$	4	♪	𝅘𝅥𝅯𝅘𝅥𝅯
$\frac{4}{4}$ or C	4	♩	♫

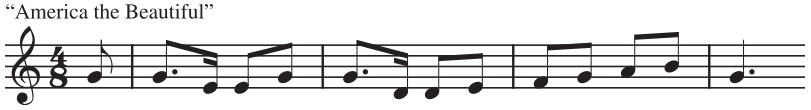
Example 2-1 illustrates how some of the songs we have been considering might be notated. The beat values were chosen arbitrarily. "Jingle Bells," for example, could also be notated correctly in $\frac{2}{2}$ or $\frac{2}{8}$ or any other simple duple time signature.

mple 2-1

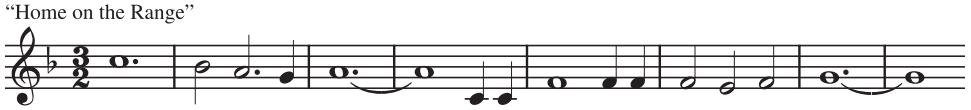
"Jingle Bells"



"America the Beautiful"



"Home on the Range"



Self-Test 2-3

(Answers appear in Appendix D.) (p. 568)

A. Fill in the blanks in the following table. Remember that time signatures are not written as fractions.

Beat and meter type	Beat note	Division of the beat	Time signature
1. Simple duple			
2.			
3.			
4. Simple quadruple			
5. Simple triple			

B. Renotate the excerpts from Example 2-1 using the specified time signatures.
   1. $\frac{2}{8}$ "Jingle Bells"
   2. $\frac{4}{2}$ "America the Beautiful"
   3. $\frac{3}{4}$ "Home on the Range"

Exercise 2-3 See Workbook.

Compound Time Signatures

If the beat divides into three equal parts, as in a compound beat, the note value representing the beat will be a dotted value, as shown next.

Beat note	Division of the beat
	
	
	
	

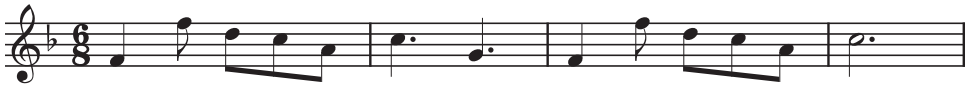
Dotted values present a problem where time signatures are concerned. For example, if there are two beats per measure, and the beat note is ♩., what would the time signature be? $\frac{2}{4\frac{1}{2}}$? $\frac{2}{4+8}$? $\frac{2}{8+8+8}$? There is no easy solution, and the method that survives today is the source of much confusion concerning compound beat. Simply stated, a compound time signature informs the musician of the *number of divisions* of the beat contained in a measure and what the *division duration* is. This means that the top number of a compound time signature will be 6, 9, or 12 because two beats times three divisions equals six, three beats times three divisions equals nine, and four beats times three divisions equals twelve. As a result, you must *divide the top number of a compound time signature by three* to find out how many beats will occur in each measure. Some examples are given in the following table.

Time signature	Beats per measure	Beat note	Division of the beat
$\frac{6}{8}$	2	♩.	♫
$\frac{6}{4}$	2	𝅗𝅥.	♩ ♩ ♩
$\frac{9}{16}$	3	𝅘𝅥𝅯.	♫
$\frac{9}{8}$	3	♩.	♫
$\frac{12}{8}$	4	♩.	♫
$\frac{12}{4}$	4	𝅗𝅥.	♩ ♩ ♩

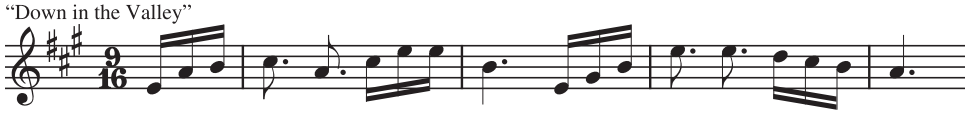
Example 2-2 illustrates some familiar tunes that use compound beat. As before, the choice of the actual beat note is an arbitrary one.

mple 2-2

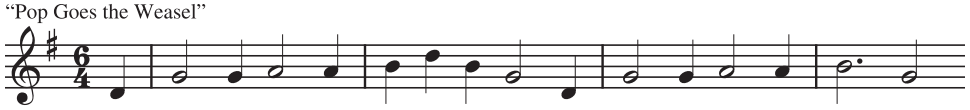
"Take Me Out to the Ball Game"



"Down in the Valley"

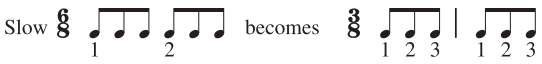


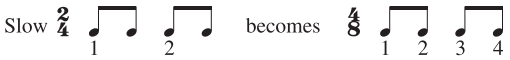
"Pop Goes the Weasel"



You can see from this discussion that compound time signatures do *not* follow the rule, so often learned by the student musician, that "the top number tells how many beats are in a measure, and the bottom number tells what note gets the beat." Of course, there are some pieces in $\frac{6}{8}$, for example, that really do have six beats to the measure, but such a piece is not really in compound duple. A measure of $\frac{6}{8}$ performed in six does not sound like compound

duple; instead, it sounds like two measures of simple triple, or $\frac{3}{8}$. In true compound duple, the listener will hear two compound beats to the measure, not six simple beats. In the same way, a slow work notated in $\frac{2}{4}$ might be conducted in four, which would seem to the listener to be simple quadruple. In both cases, the usual division value has become the beat value.





The reverse also occurs—that is, the usual beat value sometimes becomes the actual division value. For example, a fast waltz or scherzo is almost always notated as simple triple, usually as $\frac{3}{4}$. But the aural effect is of one beat per measure, for which we might use the term **compound single.** If you didn't know the metric convention of such pieces, you would probably assume when hearing them that they were in compound duple because the measures tend to group into hypermetric pairs.

1. What three numbers are found on the top of simple time signatures?
2. What three numbers are found on the top of compound time signatures?
3. If the top number of a compound time signature is 9, how many beats will be in the measure?

Self-Test 2-4

(Answers appear in Appendix D.) (p. 568)

A. Fill in the blanks.

Beat and meter type	Beat note	Division of the beat	Time signature
1. Compound duple			
2.			$\frac{9}{4}$
3.			6
4. Compound quadruple			
5.			9

B. Renotate the excerpts from Example 2-2 using the specified time signatures.
   1. $\frac{6}{4}$ "Take Me Out to the Ball Game"
   2. $\frac{9}{8}$ "Down in the Valley"
   3. $\frac{6}{16}$ "Pop Goes the Weasel"

Exercise 2-4 See Workbook.

Time Signatures Summarized

There are two types of beat—simple and compound—and three common meters—duple, triple, and quadruple—which can be combined in a total of six ways. For each of these six combinations there is a number that will always appear as the *top* part of the time signature.

	METER TYPE		
BEAT TYPE	**Duple**	**Triple**	**Quadruple**
Simple	$\frac{2}{x}$	$\frac{3}{x}$	$\frac{4}{x}$
Compound	$\frac{6}{x}$	$\frac{9}{x}$	$\frac{12}{x}$

A listener can usually recognize the beat and meter types of a passage without seeing the music. Therefore, you can usually say what the top number of the time signature is (except that duple and quadruple are often indistinguishable). However, to know what the bottom number of the time signature is, you have to look at the music because any number representing a note value can be used for any meter.

Time signature	Simple beat duration	Compound beat duration
$\frac{x}{1}$	𝅝	𝅝.
$\frac{x}{2}$	𝅗𝅥	𝅗𝅥.
$\frac{x}{4}$	♩	♩.
$\frac{x}{8}$	♪	♪.
$\frac{x}{16}$	𝅘𝅥𝅯	𝅘𝅥𝅯.

Remember that the bottom number of a time signature (the leftmost column in the preceding table) stands for the *beat* value in a *simple* time signature and the *division* value in a *compound* time signature.

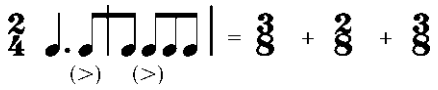
More on Durational Symbols

When rhythms are notated, it is customary to use rests, beams, ties, and dots in such a way that the metric accents and the individual beats are emphasized rather than obscured. Several incorrect and correct examples are notated in the following table.

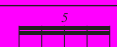
Incorrect	Correct
	
	
	
	

Of course, it is correct to notate rhythms so as to obscure the metric accent when that is the desired result. **Syncopations** (rhythmic figures that stress normally weak beats or divisions) are frequently notated in that way, as shown next.

More involved figures, such as the following, are especially common in music since 1900.



A **tuplet** refers to the division of an *undotted value* into some number of equal parts other than two, four, eight, and so on or the division of a *dotted value* into some number of equal parts other than three, six, twelve, and so on, as you can see in the following table.

Original value	Tuplet
	
	
	
	
	

Of all the possibilities, the superimposition of triplets on a simple beat is the most common. The note value used for a tuplet is determined by the next longer available note value. For example, a third of a quarter note is longer than a sixteenth note but shorter than an eighth note, so the eighth note is chosen to represent it.