

Student Edition Sample Chapter

Ninth Edition

TONAL HARMONY

With an Introduction to Post-Tonal Music

High School Edition

Mc
Graw
Hill

STEFAN
KOSTKA

BYRON
ALMÉN



Tonal Harmony

WITH AN INTRODUCTION TO POST-TONAL MUSIC

For Review Purposes Only

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Stefan Kostka

THE UNIVERSITY OF TEXAS AT AUSTIN

Byron Almén

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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.

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Preface

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

For a generation, *Tonal Harmony: With an Introduction to Post-Tonal Music* has provided a comprehensive, yet accessible and highly practical, set of tools for understanding music. Appropriate for both Advanced Placement Music Theory and Honors Music Theory courses, *Tonal Harmony* can be used 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

In the text, 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. Teachers 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 and features, including:

- 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.
- Embedded **audio** found in the digital Workbook features recordings of examples from music literature found in the text.
- Interactive **eTools**, including virtual instruments, a metronome, and a timer.

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

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 of virtually all the examples from music literature found in the text and the workbook are available with the ninth edition. The recordings that accompany the workbook are embedded for easy access in the digital Workbook. All examples were recorded using the same instrumentations seen in the text and workbook examples.

For Review Purposes Only

Using Tonal Harmony

Get the review needed to master the material with several skill-building features.

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 not sure if your answer is correct, ask your teacher.

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.

A musical staff with 15 numbered positions. The notes are: 1 (F4), 2 (F4), 3 (G4), 4 (A4), 5 (B4), 6 (C5), 7 (D5), 8 (E5), 9 (F5), 10 (G5), 11 (A5), 12 (B5), 13 (C6), 14 (D6), 15 (E6).

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.

EXERCISE 1-1

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

A piano keyboard diagram with 7 numbered blanks marked with 'x' below the keys. The 4th blank is labeled 'C4 ex.'.

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.

Two musical staves. The top staff is a grand staff (treble and bass clefs) with notes A4, F5, D6, C4, F2, C3, E4, B3, G4, E3, D4, A3. The bottom staff is a grand staff with notes G2, C5, F3, B4, E2, A5, D3, G4, B1, D5, F4, A3, C2, E6.

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.

CHECKPOINT

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.

EXAMPLES

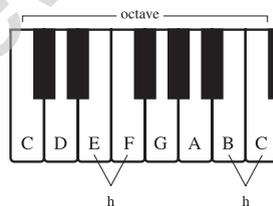
Thoughtful examples illustrate the lessons, making sure the topics are clear to students. There are numerous examples in each chapter and they are clearly labeled.

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)

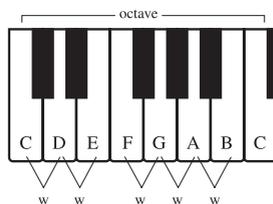
The **major scale** is a specific pattern of small steps (called half steps) and larger ones (called whole steps) encompassing an octave. A **half step** is the distance from a key on the piano to the very next key, white or black. Using only the white keys on the piano keyboard, there are two half steps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



Personalized, Adaptive, and Dynamic **Digital Resources**

Tonal Harmony is enriched with multimedia content that enhances the teaching and learning experience both inside and outside of the classroom.

Developed with the world's leading subject matter experts and organized by part and chapter level, the resources provide students with multiple opportunities to contextualize and apply their understanding. Teachers can save time, customize lessons, monitor student progress, and make data-driven decisions in the classroom with the flexible, easy-to-navigate instructional tools.

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- assigned activities,
- resources and assessments,
- Interactive eBook,
- and adaptive SmartBook assignments.



Chapter landing page links students to resources that support success.

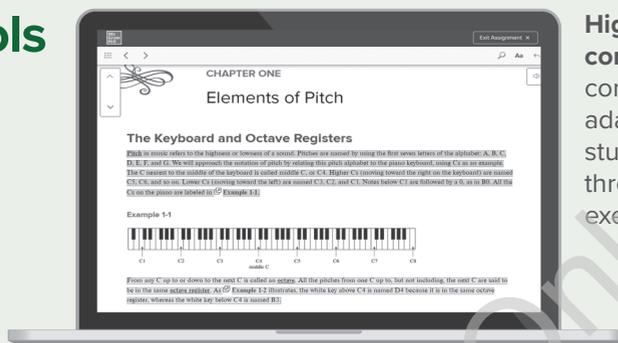


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- track which topics have been mastered,
- identify areas that need more study,
- deliver meaningful practice with guidance and instant feedback,
- recharge learning with previously completed assignments and personalized recommendations,
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Highlighted content continuously adapts as students work through exercises.



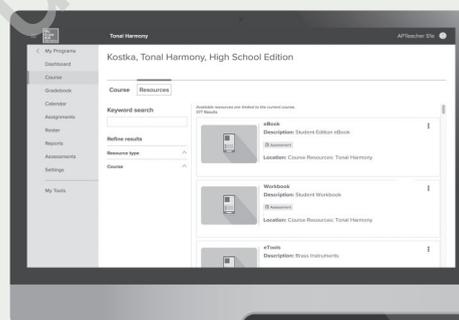
Practice sets measure depth of understanding and present a personalized learning path based on student responses.

Teacher Resources

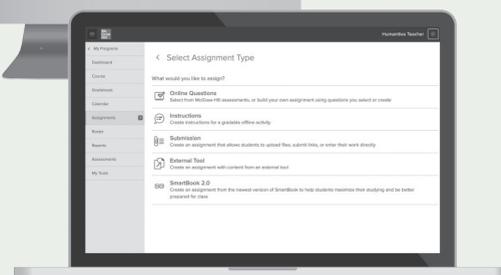
Teachers have access to the interactive student eBook and adaptive *SmartBook*® plus, a wealth of customizable chapter resources and powerful gradebook tools.

Resources include:

- an Instructor Manual with answers to exercises and additional quizzes with answers,
- student performance reports to help teachers identify gaps, make data driven decisions, and adjust instruction,
- available eTools, such as virtual instruments, to enhance lessons,
- and a digital version of the student workbook with embedded audio.



Searchable library makes it easy to find and assign resources.



Customizable assignments and quiz banks are automatically graded and populate easy-to-read reports.



New to This Edition

Both major and minor changes 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.

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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.

Example 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.

Example 2 Debussy, “La Cathédrale engloutie,” from 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.†

Example 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.

Example 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.

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.

* 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.

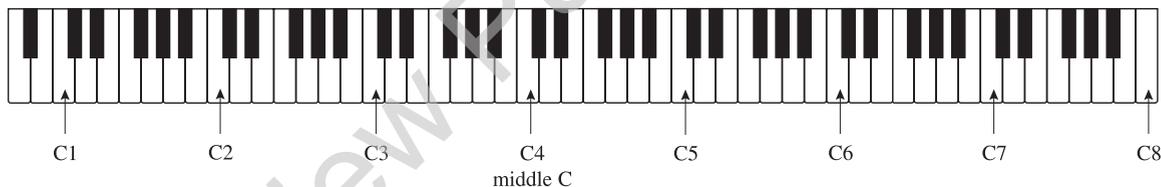
Chapter One

Elements of Pitch

The Keyboard and Octave Registers

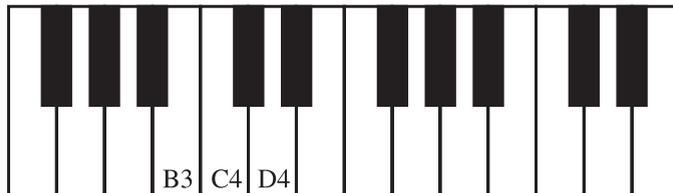
Pitch in music refers to the highness or lowness of a sound. Pitches are named by using the first seven letters of the alphabet: A, B, C, D, E, F, and G. We will approach the notation of pitch by relating this pitch alphabet to the piano keyboard, using Cs as an example. The C nearest to the middle of 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.

Example 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.

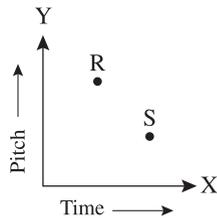
Example 1-2



Notation on the Staff

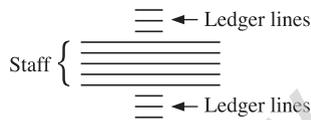
Our system of musical notation is similar to a graph in which time is indicated on the X axis and pitch is shown on the Y axis. In Example 1-3, R occurs before S in time and is higher than S in pitch.

Example 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).

Example 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.

Example 1-5

Generic name:	G clef	F clef	C clef	C clef
Specific name:	Treble clef	Bass clef	Alto clef	Tenor clef

C4 C4 C4 C4

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.

Example 1-6

Example 1-6 shows a grand staff with two staves. The top staff (treble clef) contains notes F4, C4, E5, and A3. The bottom staff (bass clef) contains notes C4, F2, A3, and E4.

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.

A piano keyboard diagram with arrows pointing to specific keys. The keys are labeled with numbers 1 through 7, and 'C4 ex.'.

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.

Part B shows a grand staff with a treble clef and a bass clef. The notes F4, B5, A4, A3, G2, D4, C4, G3, B4, C4, D3, and F4 are written below the staves.

Part B shows a grand staff with a treble clef and a bass clef. The notes E4, A2, F3, C6, B3, G4, B2, E5, D3, C4, B1, G3, D5, F2, and D4 are written below the staves.

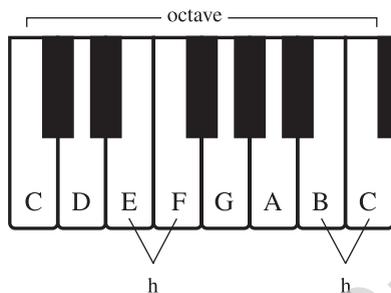
Exercise 1-1 See Workbook.

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)

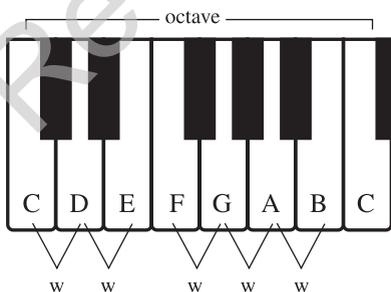
The **major scale** is a specific pattern of small steps (called half steps) and larger ones (called whole steps) encompassing an octave. A **half step** is the distance from a key on the piano to the very next key, white or black. Using only the white keys on the piano keyboard, there are two half steps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

Example 1-7



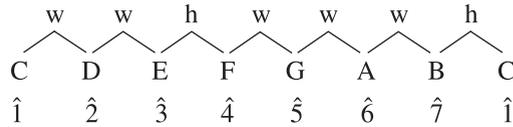
A **whole step** skips the very next key and goes instead to the following one. Using only the white keys on the piano keyboard, there are five whole steps in each octave, indicated by the letter “w” in Example 1-8.

Example 1-8

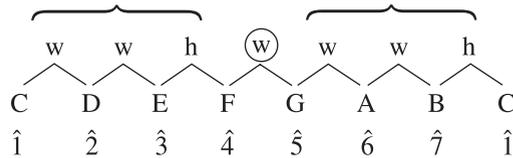


The major-scale pattern of whole and half steps is the same as that found on the white keys from any C up to the next C. In the next diagram, the numbers with carets above them ($\hat{1}$, $\hat{2}$, etc.) are scale degree numbers for the C major scale.*

* 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.



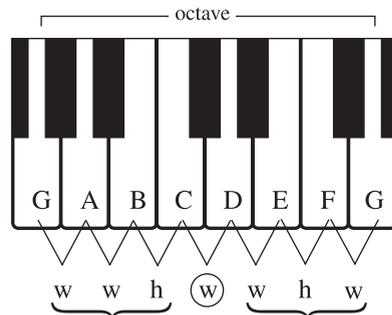
You can see from this diagram that half steps in the major scale occur only between scale degrees 3̂ and 4̂ and 7̂ and 1̂. Notice also that the major scale can be thought of as two identical four-note patterns separated by a whole step. These four-note patterns are called **tetrachords**.



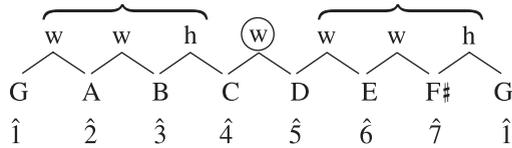
If we examine the steps on the white keys of a G-to-G octave, as in Example 1-9, we do not find the same pattern of whole and half steps that occurred in the C-to-C octave. To play a G major scale, we would need to skip the F key and play the black key that is between F and G. We will label that key 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

Example 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 \flat for the F \sharp 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 \sharp 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

A musical staff in treble clef showing seven key signatures for major keys. The keys are G major (1 sharp), D major (2 sharps), A major (3 sharps), E major (4 sharps), B major (5 sharps), F# major (6 sharps), and C# major (7 sharps). The key signatures are shown as a series of sharps on the staff. Below the staff, the number of sharps is indicated for each key: 1 sharp, 2 sharps, 3 sharps, 4 sharps, 5 sharps, 6 sharps, and 7 sharps.

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).

Example 1-12

Example 1-12 displays seven major key signatures on a grand staff (treble and bass clefs). The keys are: F major (1 flat), B♭ major (2 flats), E♭ major (3 flats), A♭ major (4 flats), D♭ major (5 flats), G♭ major (6 flats), and C♭ major (7 flats). Each key signature is shown with its corresponding number of flats below the staff.

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.

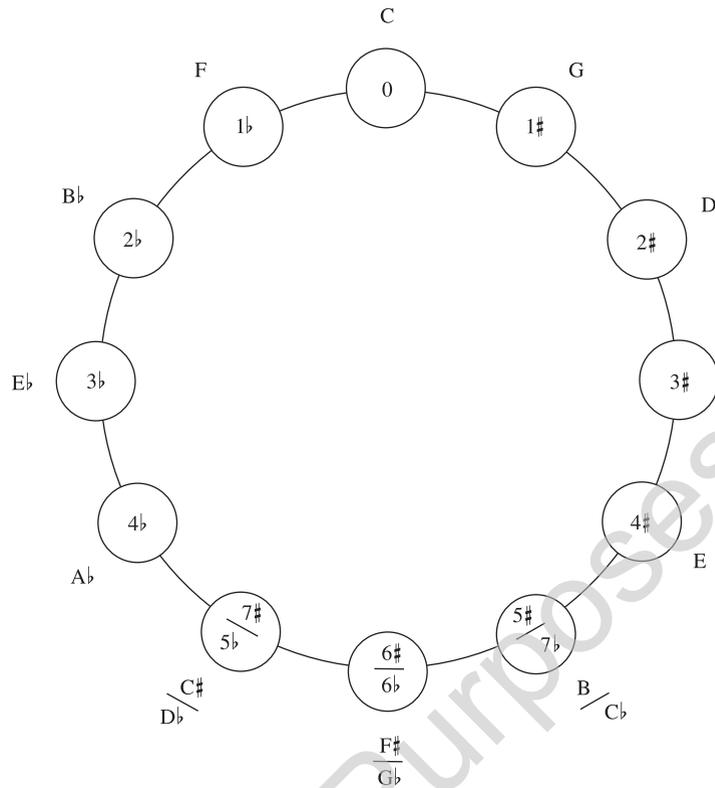
The key signatures in Examples 1-11 and 1-12 must be memorized—not only the number of accidentals involved but also their order and placement on the staff. Notice that the pattern of placing the sharps on the staff changes at the fifth sharp for both the treble and the bass clefs. Try saying aloud the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

Example 1-13

Example 1-13 shows musical notation for key signatures in alto and tenor clefs. The notation includes a grand staff with two systems of two staves each. The first system shows a key signature with three sharps (F♯, C♯, G♯) in the alto and tenor clefs. The second system shows a key signature with three flats (B♭, E♭, A♭) in the alto and tenor clefs.

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 $\bar{5}$ (the fifth scale degree) of the previous key. If you go counterclockwise, each new key begins on $\bar{4}$ of the previous one.



CHECKPOINT

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.

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

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

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 \flat	F	G	A \flat	B \flat	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 \flat	F	G	A \flat	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 \flat	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**.

Example 1-14

Natural minor

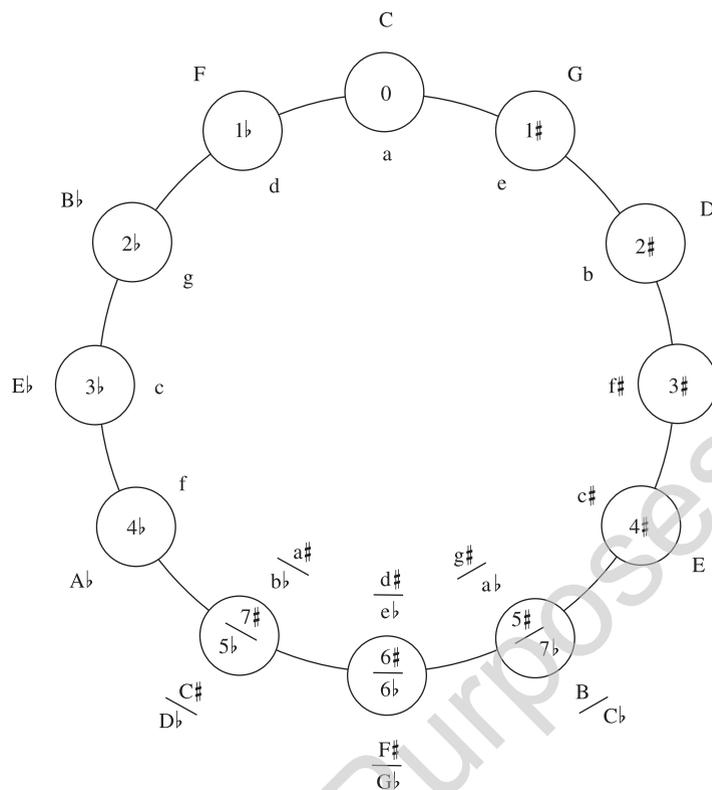
Harmonic minor

Melodic minor

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 \flat , E \flat , and A \flat . The key signature of c minor, then, is the same as the key signature of E \flat major; c minor and E \flat 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 $g\sharp$, $d\sharp$, and $a\sharp$, 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.

Example 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:

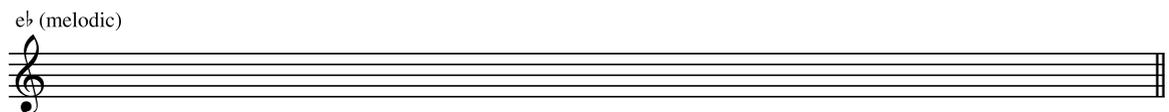
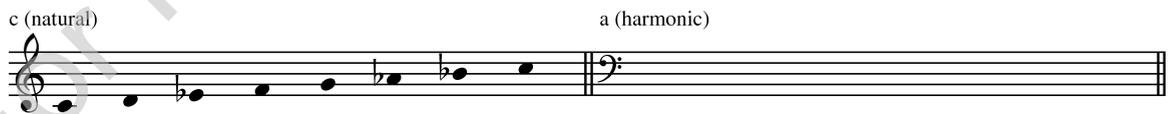
Major key		Minor key	
B \flat	2 flats	b \flat	5 flats
E	4 sharps	e	1 sharp
D	2 sharps	d	1 flat

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.



b \flat (natural) g \sharp (harmonic)

f \sharp (melodic)

B. Identify these minor key signatures.

$\frac{a}{\text{ex.}}$ minor $\frac{1}{1}$ minor $\frac{2}{2}$ minor $\frac{3}{3}$ minor $\frac{4}{4}$ minor $\frac{5}{5}$ minor $\frac{6}{6}$ minor $\frac{7}{7}$ minor

C. Notate the specified minor key signatures.

b d g \sharp c f \sharp a b \flat a \sharp

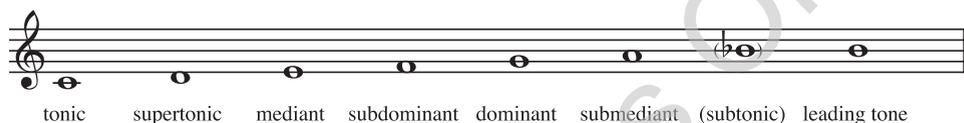
D. Fill in the blanks.

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 \sharp minor	11. Three flats	___ minor
5. Six sharps	___ minor	12. _____	a \flat minor
6. _____	b \flat minor	13. One sharp	___ minor
7. _____	a \sharp minor	14. Five sharps	___ minor

Scale Degree Names

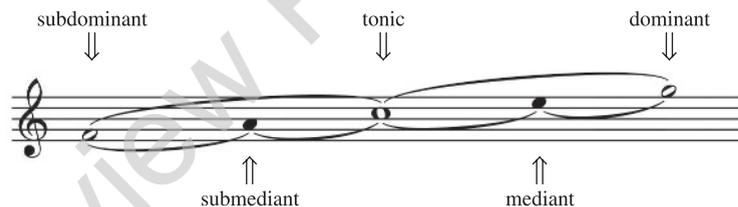
Musicians in conversation or in writing often refer to scale degrees by a set of traditional names rather than by numbers. The names are shown in Example 1-16. Notice that there are two names for $\hat{7}$ in minor, depending on whether or not it is raised.

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



CHECKPOINT

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.

C:

G:

d:

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.

Example 1-18

Harmonic intervals Melodic intervals

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.

Example 1-19

1 2 3 3 3 3 4 (etc.)

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 $\hat{1}$ 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 $\hat{1}$ in the major scale as the *bottom* note.

Example 1-20

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

Example 1-21

P5 above P5 above P5 above
 $D\sharp = ?$ $D_b = A_b$ $D\sharp = A\sharp$

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

$\hat{1} - \hat{2}$ $\hat{1} - \hat{3}$ $\hat{1} - \hat{6}$ $\hat{1} - \hat{7}$
 M2 M3 M6 M7

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

M2 m2 M3 m3 M6 m6 M7 m7

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.

1 5 2 4 3 1 4 5 5 8 6 4 7 5 8 4 9 5 10 8

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

1 3 2 6 3 7 4 2 5 6 6 2 7 3 8 7 9 6 10 2

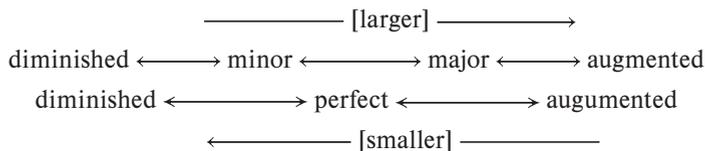
C. Notate the specified intervals above the given notes.

1 m2 2 P4 3 M6 4 m3 5 P5 6 m6 7 P8 8 M2 9 M7 10 P4
11 M3 12 P5 13 m7 14 m2 15 M6 16 P5 17 P8 18 M7 19 M3 20 m7

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:



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	<u>-2</u>	<u>-3</u>	<u>-4</u>	<u>-5</u>	<u>-6</u>	<u>-7</u>
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).

Example 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.

Example 1-25



m6† = ? M3† = B3 m6† = B2

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).

CHECKPOINT

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 $\text{^}5$ 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.

1 2 3 4 5 6 7 8 9 10

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.

A musical staff in bass clef with a key signature of one flat (Bb). The notes are: G2, F2, E2, D2, C2, B1, A1, G1, F1, E1. Below the staff are ten interval labels: P5/1, m7/2, m3/3, M6/4, +4/5, M7/6, +5/7, m6/8, M2/9, °7/10.

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.

A musical staff in treble clef with a key signature of one flat (Bb). The melody consists of 12 notes: G4, A4, Bb4, C5, Bb4, A4, G4, F4, E4, D4, C4, B3. Intervals are numbered 1 through 12 between consecutive notes.

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	_____	_____	_____	_____	_____



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.