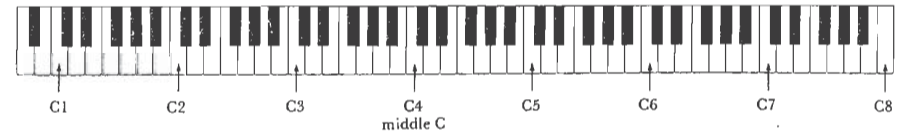


THE KEYBOARD AND OCTAVE REGISTERS

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 keyboard, using C's as an example. The C nearest the middle of the keyboard is called *middle C* or C4. Higher C's (moving toward the right on the keyboard) are named C5, C6, and so on. Lower C's (moving left) are named C3, C2, and C1. All the C's 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 would be named D4, because it is in the same octave register, but the white key below C4 would be named B3.

4 Elements of Pitch

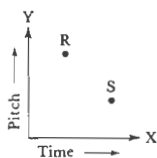
Example 1-2.



NOTATION ON THE STAFF

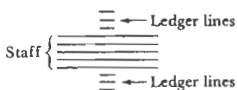
Our system of musical notation is similar to a graph in which time is indicated on the X axis and pitch is shown on the Y axis. In Example 1-3 R occurs before S in time and is higher than S in pitch.

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 in order 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.

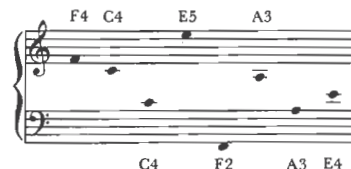
Example 1-5.



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.

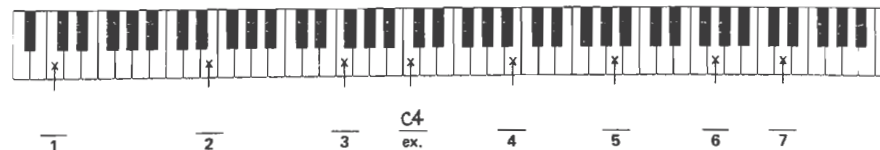
Example 1-6.



SELF-TEST 1-1

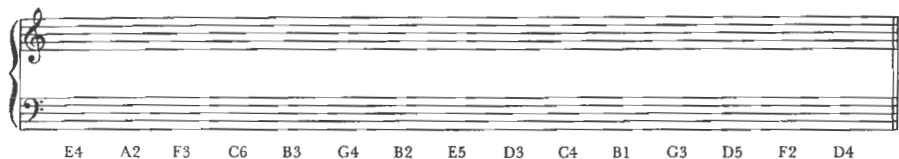
(Answers begin on page 559.)

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



6 Elements of Pitch

B. Notate the indicated pitches on the staff in the correct octave.

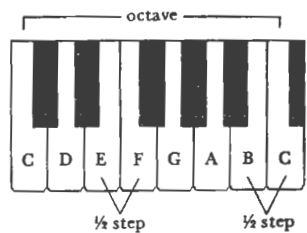


EXERCISE 1-1. See Workbook.

THE MAJOR SCALE

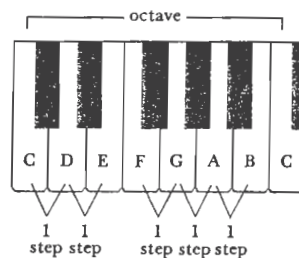
The *major scale* is a specific pattern of small steps (called half steps) and larger ones (called whole steps) encompassing an octave. A *half step* is the distance from a key on the piano to the very next key, white or black. Using only the white keys on the piano keyboard, there are two half steps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

Example 1-7.

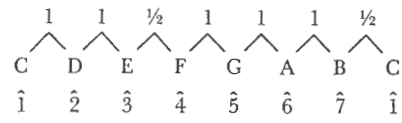


A *whole step* skips the very next key and goes instead to the following one. Using only the white keys on the piano keyboard, there are five whole steps in each octave (Ex. 1-8).

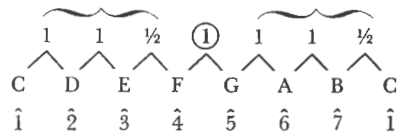
Example 1-8.



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 diagram below, the numbers with carats above them ($\hat{1}$, $\hat{2}$, etc.) are scale degree numbers for the C major scale.*



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.

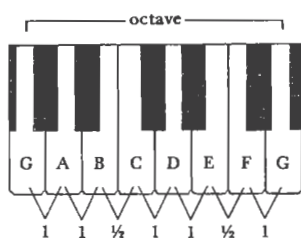


*Throughout this book we will refer to major scales with upper-case letters—for example, A major or A—and minor scales with lower-case letters—for example, a minor or a.

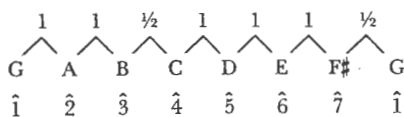
If we examine the steps on the white keys of a G-to-G octave, as in Example 1-9, we do not find the same pattern of whole and half steps that occurred in the C-to-C octave. In order to play a G major scale, we would need to skip the F key and play the black key that is between F and G. We will label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



The 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 (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 (Ex. 1-12).

Example 1-12.

F major B \flat major E \flat major A \flat major D \flat major G \flat major C \flat major

1 flat 2 flats 3 flats 4 flats 5 flats 6 flats 7 flats

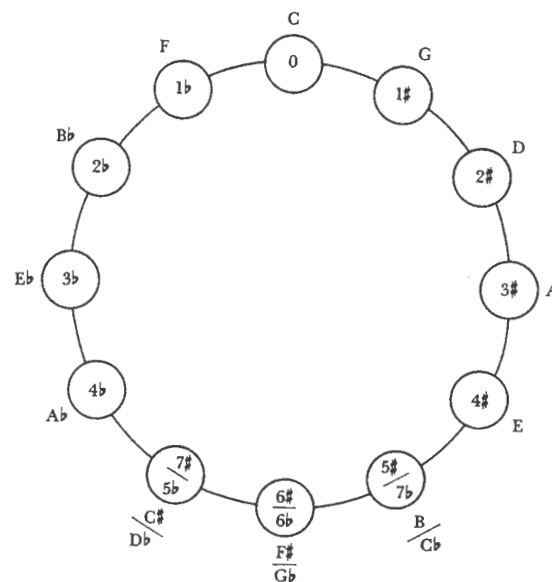
You may have noticed that there are three pairs of major keys that would sound exactly the same—that is, they would be played on the very same keys of the piano keyboard.

- B major = C \flat major
- F \sharp major = G \flat major
- C \sharp major = D \flat major

Notes that are spelled differently but sound the same are said to be *enharmonic*; so B major and C \flat major, for example, are *enharmonic keys*. 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 upon 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 repeating the order of accidentals for sharps (FCGDAEB) and for flats (BEADGCF) until you feel confident with them.

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 below, you will see that each new key begins on $\hat{5}$ (the fifth scale degree) of the previous key.



SELF-TEST 1-2

(Answers begin on page 560.)

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

C major E major

D \flat major B \flat major

The three minor scale types are summarized in Example 1-13. The scale degrees that differ from the major are circled. Notice the arrows used in connection with the melodic minor scale in order to distinguish the ascending $\hat{6}$ and $\hat{7}$ from the descending $\hat{6}$ and $\hat{7}$.

Example 1-13.

Natural minor

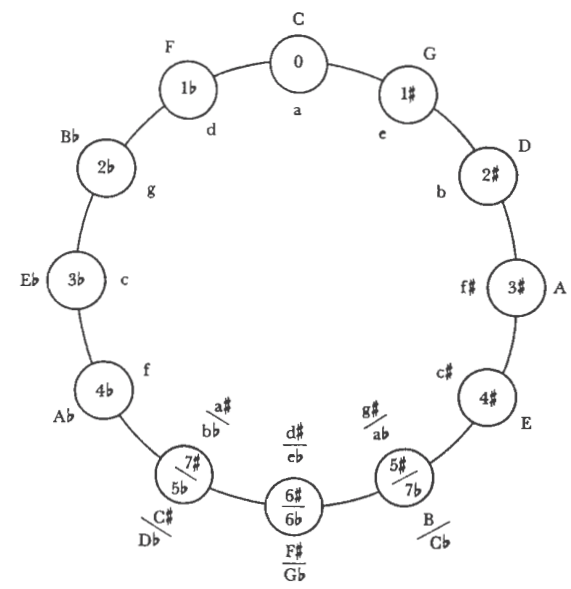
Harmonic minor

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 1-13, you can see that the natural minor scale on C requires three accidentals: Bb, Eb, and Ab. The key signature of c minor, then, is the same as the key signature of Eb major; c minor and Eb major are said to be *relatives*, since they share the same key signature. The $\hat{3}$ of any minor key is $\hat{1}$ of its relative major and the $\hat{6}$ of any major key is $\hat{1}$ of its relative minor. 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 *parallels*. 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.



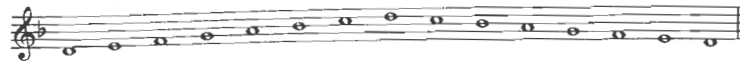
You may find it easier to learn the minor scales in terms of their relative majors, as in the circle-of-fifths diagram above, than in terms of their parallel majors, which is how minor scales were introduced on pages 13-14. This will be most helpful regarding the keys of g#, d#, and a#, which have no 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 in order to spell the other forms. Example 1-14 illustrates the spellings for the related keys of F major and d minor.

Example 1-14.

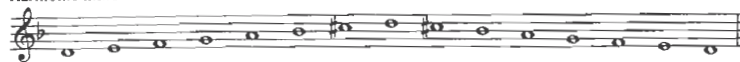
F major scale

16 Elements of Pitch

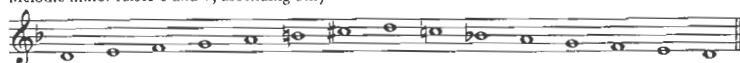
Relative minor, natural form



Harmonic minor raises 7



Melodic minor raises 6 and 7, ascending only

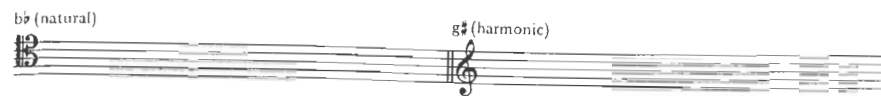
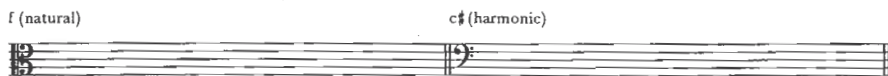
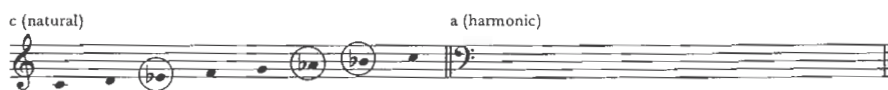


It is very important to practice faithfully all of the major and minor scales on an instrument until they become memorized patterns. An intellectual understanding of scales cannot substitute for the secure tactile and aural familiarity that will result from those hours of practice.

SELF-TEST 1-3

(Answers begin on page 561.)

A. Notate the specified scales using accidentals, *not* key signatures. Circle the notes that differ from the *parallel* major scale. The melodic minor should be written both ascending and descending.



B. Identify these minor key signatures.



C. Notate the specified minor key signatures.



D. Fill in the blanks.

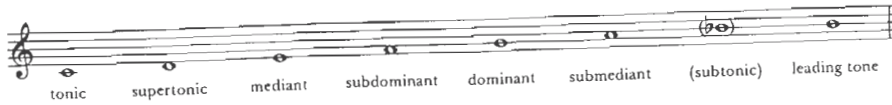
Key signature	Name of key	Key signature	Name of key
1. _____	d minor	8. Two flats	___ minor
2. Six flats	___ minor	9. _____	f minor
3. Four sharps	___ minor	10. _____	b minor
4. _____	f# minor	11. Three flats	___ minor
5. Six sharps	___ minor	12. _____	a \flat minor
6. _____	b \flat minor	13. One sharp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

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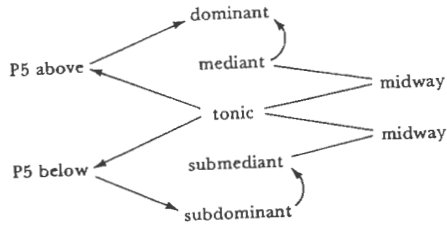
SCALE DEGREE NAMES

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 1-15. Notice that there are two names for 7̇ in minor, depending upon whether it is raised or not.

Example 1-15.



The origin of some of these names is not what you would probably expect from studying Example 1-15. For example, *subdominant* does not mean "below the dominant," as the chart below illustrates.



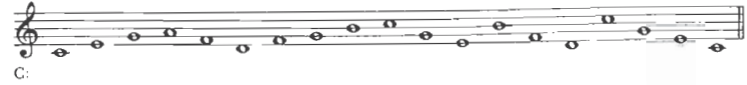
CHECKPOINT

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.

1̇ 2̇ 3̇ 4̇ 5̇ 6̇ 7̇ 1̇ 7̇ 6̇ 5̇ 4̇ 3̇ 2̇ 1̇
 3̇ 5̇ 7̇ 6̇ 4̇ 2̇ 1̇ 6̇ 3̇ 7̇ 2̇ 5̇ 4̇ 3̇ 1̇
 5̇ 2̇ 7̇ 4̇ 6̇ 3̇ 1̇ 2̇ 7̇ 5̇ 6̇ 4̇ 1̇ 3̇ 2̇

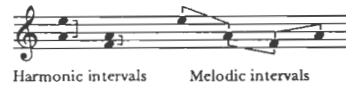
2. Call out or sing the scale degree names contained in each example below.



INTERVALS

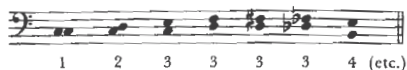
An *interval* is the measurement of the distance in pitch between two notes. A *harmonic interval* results if the notes are performed at the same time, while a *melodic interval* occurs when the notes are played successively (Ex. 1-16). The method of measuring intervals is the same for both harmonic and melodic intervals.

Example 1-16.



There are two parts to any interval name: the numerical name and the modifier that precedes the numerical name. As Example 1-17 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 1-17.



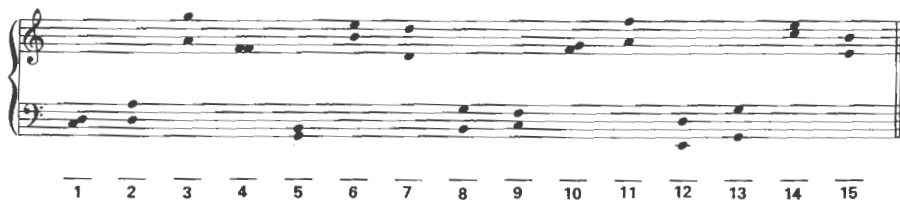
In speaking about intervals, we use the terms *unison* instead of 1 and *octave* (8ve) instead of 8. We also say 2nd instead of “two,” 3rd instead of “three,” and so on. Intervals smaller than an 8ve are called *simple intervals*, while the larger intervals (including the 8ve) are called *compound intervals*.

It is important to notice in Example 1-17 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 handled the same way for harmonic intervals of a 2nd, 3rd, or 4th, if both of the notes require an accidental.

SELF-TEST 1-4

(Answers begin on page 562.)

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 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.

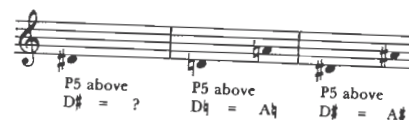
The term *perfect* (abbreviated P) is a modifier used only in connection with unisons, 4ths, 5ths, 8ves, and their compounds (11ths, and so on). As Example 1-18 illustrates, a P1, P4, P5, and P8 can all be constructed by using $\hat{1}$ in the major scale as the *bottom* note.

Example 1-18.



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. 1-19).

Example 1-19.



Usually, 2nds, 3rds, 6ths, and 7ths are modified by the terms *major* (M) or *minor* (m). 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 1-20 illustrates.

Example 1-20.



If a major interval is made a half step smaller without altering its numerical name, it becomes a minor interval (Ex. 1-21).

Example 1-21.

Musical staff showing intervals: M2, m2, M3, m3, M6, m6, M7, m7.

SELF-TEST 1-5

(Answers begin on page 562.)

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

Musical staff with intervals: 1/1, 2/4, 3/1, 4/5, 5/8, 6/4, 7/5, 8/4, 9/5, 10/8.

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

Musical staff with intervals: 1/3, 2/6, 3/7, 4/2, 5/6, 6/2, 7/3, 8/7, 9/6, 10/2.

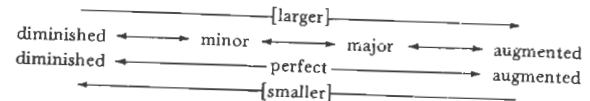
C. Notate the specified intervals above the given notes.

Musical staff with intervals: m2/1, P4/2, M6/3, m3/4, P5/5, m6/6, P8/7, M2/8, M7/9, P4/10, M3/11, P5/12, m7/13, m2/14, M6/15, P5/16, P8/17, M7/18, M3/19, m7/20.

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 below.



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; for example, the interval D-A inverts to A-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	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. 1-22).

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Example 1-22.



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 1-23, transpose the B3 down an 8ve, and you find that the answer is B2.

Example 1-23.



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.

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*, while 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 staff.

The *major scale* consists of 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, while the *melodic minor scale* lowers scale degree $\hat{3}$ when ascending and scale degrees $\hat{3}$, $\hat{6}$ and $\hat{7}$ 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*. 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, while 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.