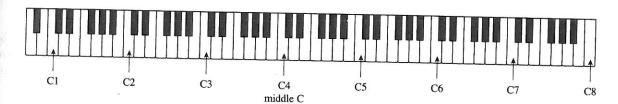
Chapter One Elements of Pitch

The Keyboard and Octave Registers

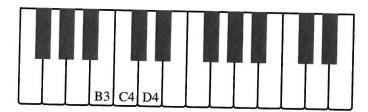
Pitch in music refers to the highness or lowness of a sound. Pitches are named by using the first seven letters of the alphabet: A, B, C, D, E, F, and G. We will approach the notation of pitch by relating this pitch alphabet to the piano keyboard, using Cs as an example. The C nearest the middle of the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

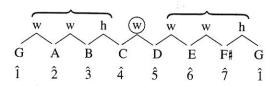
Example 1-1



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, while the white key below C4 is named B3.

Example 1-2





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}^{\sharp} in a G major scale. The scale is written on the staff in Example 1-10.

Example 1-10

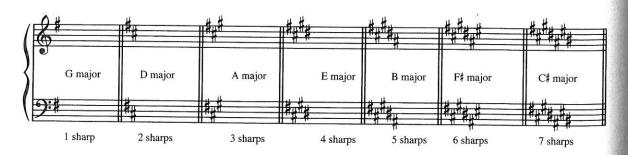


Notice that when we write or say the names of notes and accidentals, we put the accidental last (as in F# or F sharp), but in staff notation the accidental always *precedes* the note that it modifies (as in Ex. 1-10).

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).

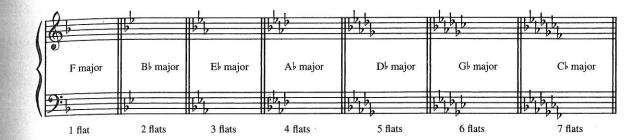
Example 1-11



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



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 Fb, are said to be **enharmonic**. 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



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.

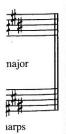
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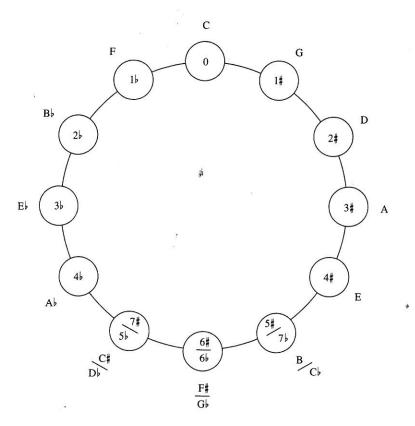
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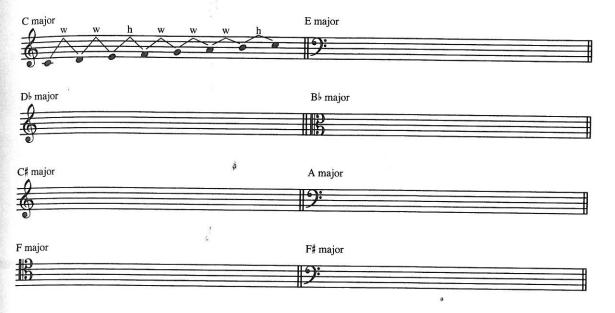
CHECKPOINT

- 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 begin on page 553.)

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	B₁ 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 _b major	12	Cl major
6	B major	13. Four sharps	major
7. Six flats	major	14	A major

cement

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

	Major key	Key signature	Scale degree	Is this note
Ex.	C	O#/Ob	<u></u>	E
1.		-	<u> </u>	F
2.	D _b		<u> </u>	
3.	G		<u> </u>	F#
4.	B		<u></u>	
5.	A _b			<u> </u>
6.		<u>7</u> b		F,
	1			

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 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	В	С
Scale degree	î	2	3	$\hat{4}$	ŝ	â	ĵ	î
c natural minor	С	D	E	F	G	A_{\flat}	ВЫ	С

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	С	D	E	\mathbf{F}	G	A	В	С
Scale degree	î	2	3	$\hat{4}$	ŝ	6	2	î
c harmonic minor	C	D	Eb	F	G	Ab	В	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 $\hat{3}$.

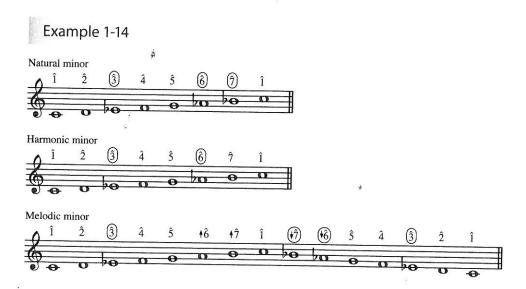
C major	C	D	E	F	G	A	В	C
Scale degree	î	2	3	â	ŝ	Ĝ	2	î
c ascending melodic minor	C	D	Еы	F	G	A	В	С

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

Min

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 connection with the melodic minor scale in order to distinguish the ascending 6 and 7 from the descending 6 and 7.

Also note that scale degrees 1 through 5 are identical in all three forms of the minor scale. This pattern of w-h-w-w is known as the **minor pentachord**.



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: 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** because they share the same key signature. The relative major of any minor key starts on 3 of the minor scale, and the relative minor of any major key begins on 6 of the major scale. If a major scale and a minor scale share the same 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.

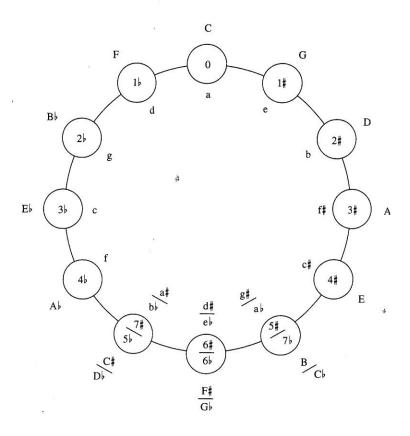
The circle of fifths is a convenient way to display the names of the minor keys and their relative majors, as well as their key signatures. In the following diagram, the names of the minor keys (in lowercase, as usual) are inside the diagram.

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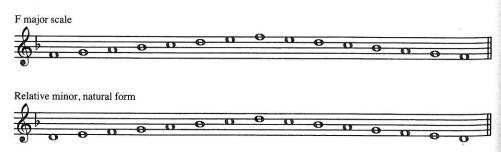
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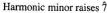
or scale.



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 on page 10. 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







Melodic minor raises 6 and 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:

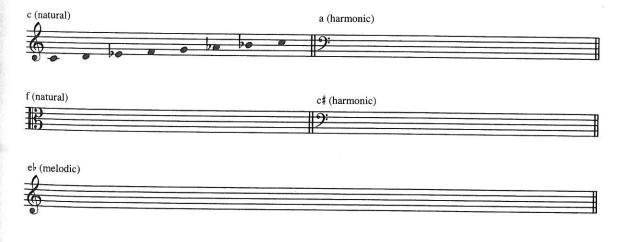
M	ajor key	M	inor key	
ВЬ	2 flats	bb	5 flats	
E	4 sharps	e	1 sharp	
D	2 sharps	d	1 flat	

It is very important to practice faithfully all 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 554.)

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



ijors, as in ors, which arding the tive major ne natural ically, you and raise inor scale.







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	al minor
6	b₁ major	13. One sharp	minor
7	a# major	14. Five sharps	minor

Exercise 1-3 See Workbook.

Scale Degree Names

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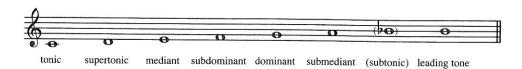
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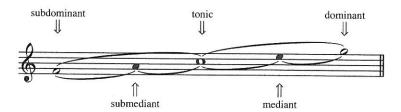
Musicians in conversation or in writing often refer to scale degrees by a set of traditional names rather than by numbers. The names are shown in Example 1-16. Notice that there are two names for $\hat{7}$ in minor, depending on whether or not it is raised.

Example 1-16



The origin of some of these names is illustrated in 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

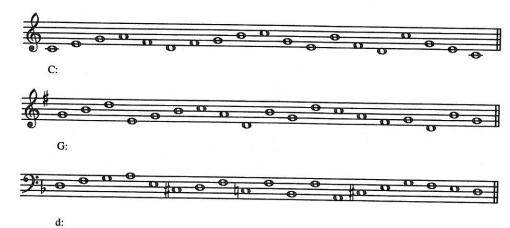


CHECKPOINT

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.

1 2 3 4 5 6 7 1 7 6 5 4 3 2 1 3 5 7 6 4 2 1 6 3 7 2 5 4 3 1 5 2 7 4 6 3 1 2 7 5 6 4 1 3 2 2. Call out or sing the scale degree names contained in each example that 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.

Example 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.

Example 1-19



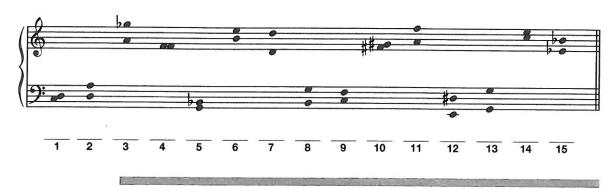
In talking about intervals, we use the terms **unison** instead of 1, and **octave** (8ve) instead of 8. We also say 2nd instead of "two," 3rd instead of "three," and so on. Intervals smaller than an 8ve are called **simple intervals**, whereas larger intervals (including the 8ve) are called **compound 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, or 4th, if both notes require an accidental.

Self-Test 1-4

(Answers begin on page 555.)

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



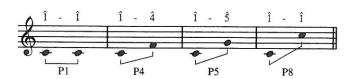
Exercise 1-4 See Workbook.

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 1 in the major scale as the *bottom* note.

Example 1-20









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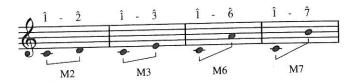
fier that a meaaccidenIf we want to spell one of these intervals above E_{\flat} , for example, we need only to think of scale steps $\hat{1}$, $\hat{4}$, and $\hat{5}$ of the E_{\flat} major scale. If the bottom note does not commonly serve as $\hat{1}$ of a major scale (such as $D\sharp$), remove the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

Example 1-21



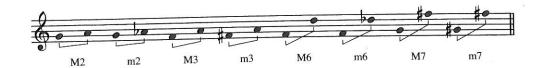
The modifiers **major** and **minor** (abbreviated as M and m) are used only in connection with 2nds, 3rds, 6ths, and 7ths. The intervals formed by $\hat{1}-\hat{2}$, $\hat{1}-\hat{3}$, $\hat{1}-\hat{6}$, and $\hat{1}-\hat{7}$ in the major scale are all major intervals, as Example 1-22 illustrates.

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 begin on page 555.)

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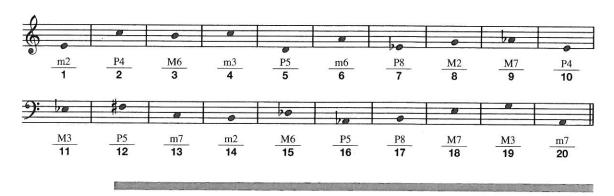
A. All the intervals that follow are unisons, 4ths, 5ths, or 8ves. Put "P" in the space provided *only* if the interval is a perfect interval.



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



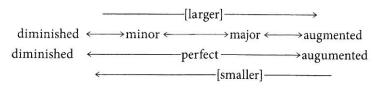
C. Notate the specified intervals above the given notes.



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:



nection e major

e, it be-/ lower-



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-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. 1-24).

Example 1-24



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

Old modifier	m	M	P	+	0
New modifer	М	m	P	0	

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



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.

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. 1-24).



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ill probenefit 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 °5 inverted becomes a _____
- 5. Intervals that are relatively displeasing to the ear are classified as

Self-Test 1-6

(Answers begin on page 555.)

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 _____
- 5. °5 becomes _____
- 2. M7 becomes _____
- 6. m2 becomes _____
- 3. +2 becomes _____
- 7. m6 becomes _____
- 4. M3 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.)



D. Label each interval in this melody (from Wagner's $G\"{o}tterd\"{a}mmerung$). Interval 8 is from the A5 down to the D \sharp 5.



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
С					
d			-		
d bass					

	6. M2	7. P5	8. M3	9. +2	10. P4
c					
d	1		50 <u>024309030</u> 0	of the	
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 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**, 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.

Variations



For additional review and practice, please see Chapter 1 on our website at www.mhhe.com/kostka7e.

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P4