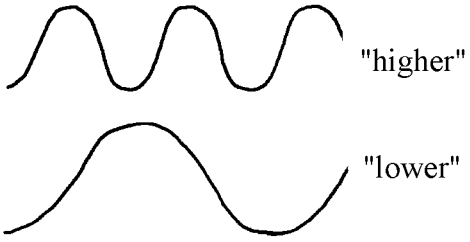
Christopher Newport University Department of Music
Theory Audition Review Booklet

Contents

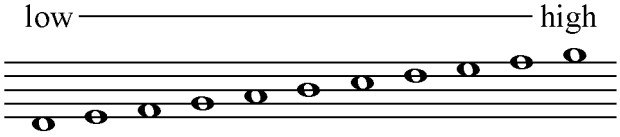
Lesson I: Notation of Pitch

In Western music, the system of notation has evolved over many centuries. As new styles emerged, new demands were placed on older traditions. For the most part, the notation system was modified and adapted to suit necessity, leaving us with a system that does the job but is not entirely logical. Much of what introductory theory is about is getting oriented to the conventions of notation we have inherited.

Let's start with the concept of **pitch**, which is also referred to as **note** or **tone**. We customarily think of pitches in relation to "up" and "down," but what differentiates pitches physically is a property of cycles of sound waves, or **frequency**.

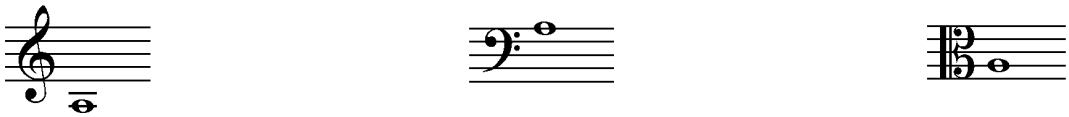


The notation system places notes on a group of five lines known as the **staff**. Each line and space, known as **staff steps**, designates a note. Notes on the staff below are arranged from low to high.



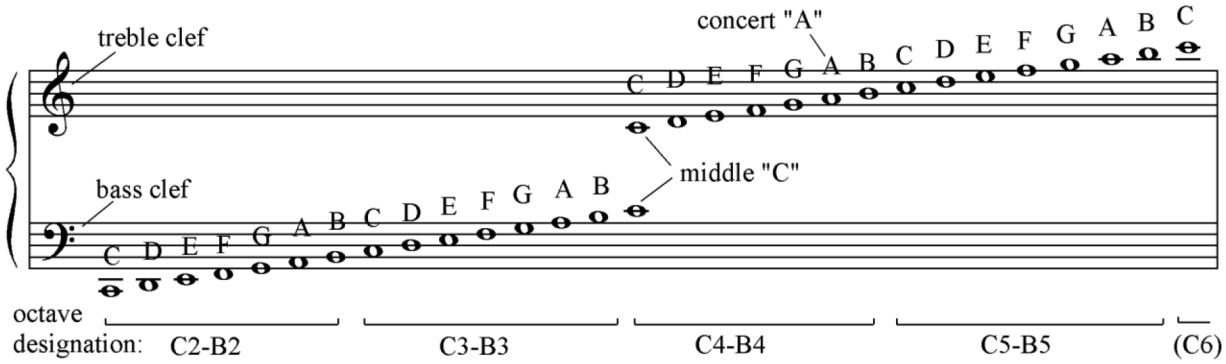
Because the **range** of notes possible on modern instruments far exceeds what is practical on a single staff, a system of **clefs** is used. Clefs orient the staff to a specific range of notes. The pitch that has 440 cycles of waves per second, **concert "A**," is found quite low on the **treble clef** (also known as **G clef**), relatively high on the **bass clef** (**F clef**), and closer to the middle of the **alto clef** (**C clef**).

concert A in three clefs



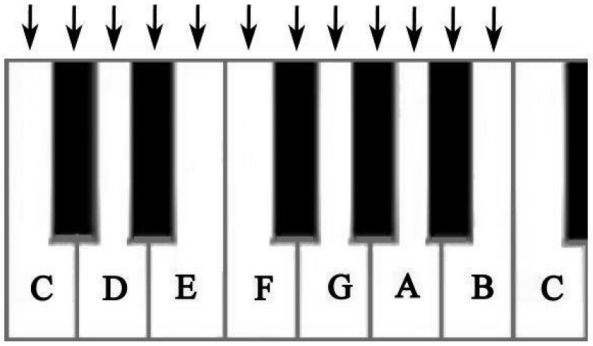
treble clef bass clef alto clef

Notes are named using consecutive letter names A through G, at which point we begin with A again. The reason for this is that after passing through seven staff steps an acoustical threshold is reached on the eighth step where the number of cycles per second is exactly double the number of the first note. These two notes sound particularly alike, and their relationship is known as the **octave**. Thus, we refer to **octave equivalent** notes with the same letter name. As all A's are octave equivalent, so are all B's, C's, and so forth. Two staves with treble and bass clefs placed together are referred to as the **grand staff**.



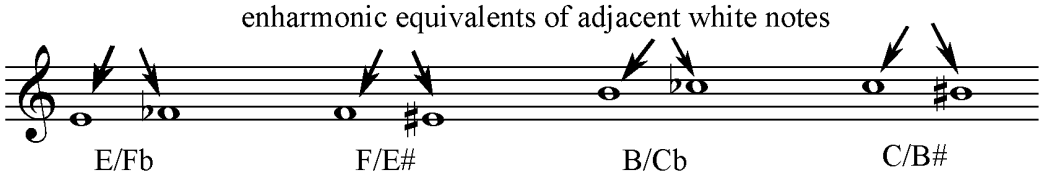
Several observations should be made about the graphic above. First, notes may be placed outside the immediate range of the staff through the use of **ledger lines**. Though it would be impractical to do so, it is theoretically possible to notate *any* pitch in *any* clef using ledger lines. Second, **middle "C"** is the symmetrical dividing point between treble and bass clefs. Third, the "octave designation" numbers below the grand staff are another means available for describing the precise registration of a pitch. For instance, concert "A" is A4. Middle "C" is C4.

Though there are only seven different letter names for notes on the staff, there are actually twelve different pitches possible within any octave. This discrepancy can be seen by looking at the piano keyboard.



The white notes correspond to the letter names found on the staff. Yet as adjacent notes are played from left to right, black notes intervene between many of the white notes. These notes are designated in relation to the white note on one side or the

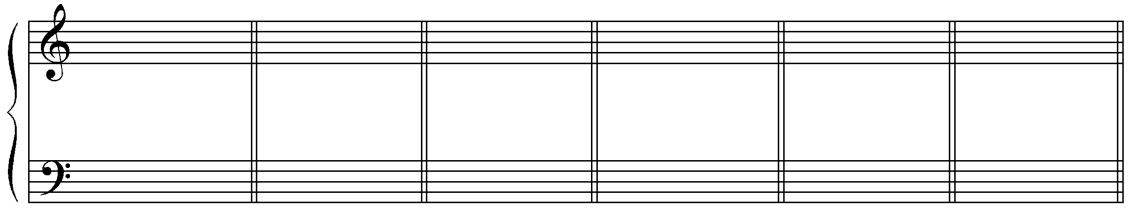
other. For instance, the black note between C and D can either be called "C sharp" or "D flat." To notate this pitch on the staff, either a **sharp (#)** is placed before C or a **flat (♭)** is placed before D. The dual designation of the same pitch is called **enharmonic equivalence**. If a sharp is placed before any note, it is assumed that the note has been *raised* to the next adjacent pitch up, which is usually a black note. Likewise, placing a flat before a note *lowers* that note to the next adjacent pitch down. When there is no black note directly adjacent in the direction of the **accidental**, a white key is used. There are two places in the **diatonic collection** where white notes are not separated by black notes, between E and F and between B and C. Thus, E can be spelled enharmonically as Fb, and F can be spelled as E#. Cb/B and B#/C are also considered enharmonic equivalents.



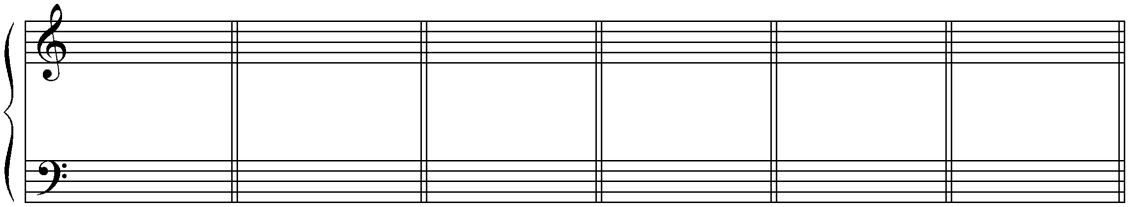
Occasionally it is necessary to notate a pitch using *two* sharps or flats. In such a case, the sounding pitch is the next adjacent pitch up or down from the first accidental. Two sharps are called a *double* sharp and two flats are a *double* flat.

Lesson #1 Exercises

1) place the note on the grand staff:



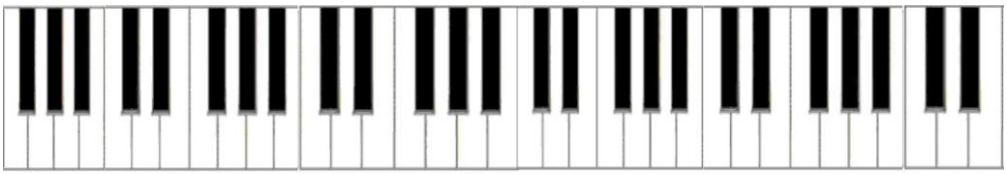
F5 C#3 Eb2 B5 G#3 Ab4



B1 D#6 C#4 F5 B#2 G6

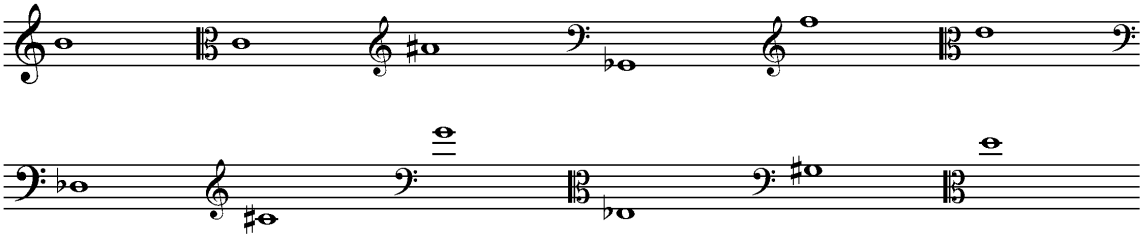
2) place the note on the piano keyboard (draw lines from the specified notes to the keyboard)

D2 Bb1 A#4 E3 F5 G1 D#6



(middle C)

3) Name the note:

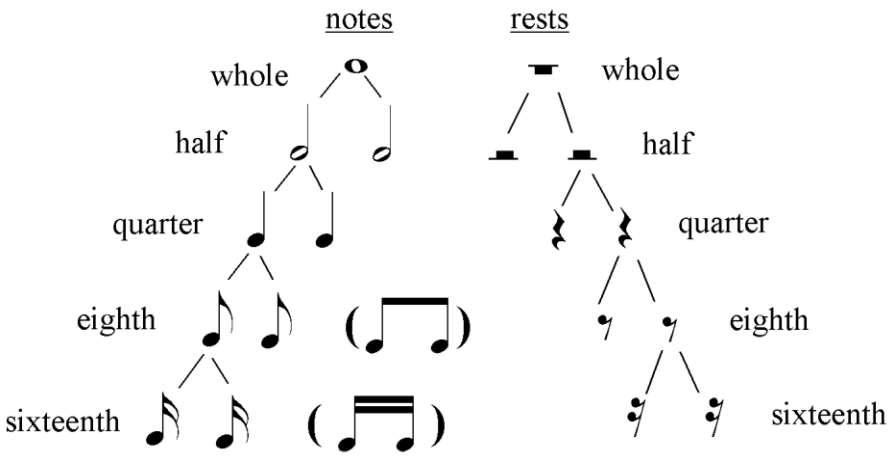


4) Draw lines between enharmonic equivalents:

set A		set B		set C	
C	F	A	Ebb	Fb	D##
Gb	F##	Bb	C	B#	Dbb
B	B#	Db	Db	A#	A##
E#	Cb	G#	C##	C	Cbb
G	Eb	C#	Ab	B	G###
D#	F#	D	Bbb	A	G##

Lesson II: Notation of Rhythm

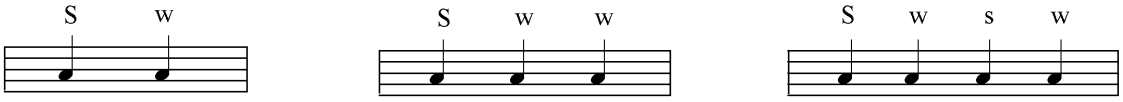
Music is an art of time. In order to accurately transmit information about time to the performer, our notation system relies on several conventions. A principal feature of modern notation is the flexible, proportionate division of time values. Every rhythmic symbol can be divided in half. Each of those divisions can also be divided, and so on. Inversely, combining two of the same rhythmic symbols doubles its value. The conventional "tip" of this pyramid of 2:1 proportions is the **whole note**. Whole notes divide into two **half notes**, each half note divides into two **quarter notes**, quarter notes divide into **eighths**, eighths into **sixteenths**, sixteenths into thirty-seconds, etc. These various note values are used to indicate the relative length of a given pitch on the staff. A complementary system of **rests** is used to indicate lengths of silences.



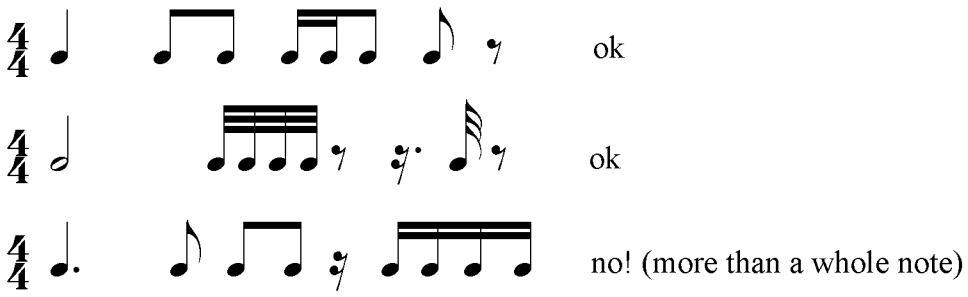
The **augmentation dot** placed to the immediate right of a note or rest increases its duration by adding half of its value (a 50% increase). For instance, a whole note followed by an augmentation dot is equal in length to a whole note tied to a half note (a "tie" is a curved line connecting two adjacent notes which combines their duration). A second augmentation dot adds half the value of the previous dot (increasing the total duration by 75%). Examples:

As we listen to music, we usually hear or "feel" a regular point of emphasis known as **beat** or **pulse**. **Tempo** refers to the speed or rate at which beats occur. We think of music as being faster or slower on this basis. Beats are often described in terms of two primary qualities, "strong" or "weak," though rhythmic qualities in real music are more complex. Beats tend to persist in a regular pattern of two (S w), three (S w

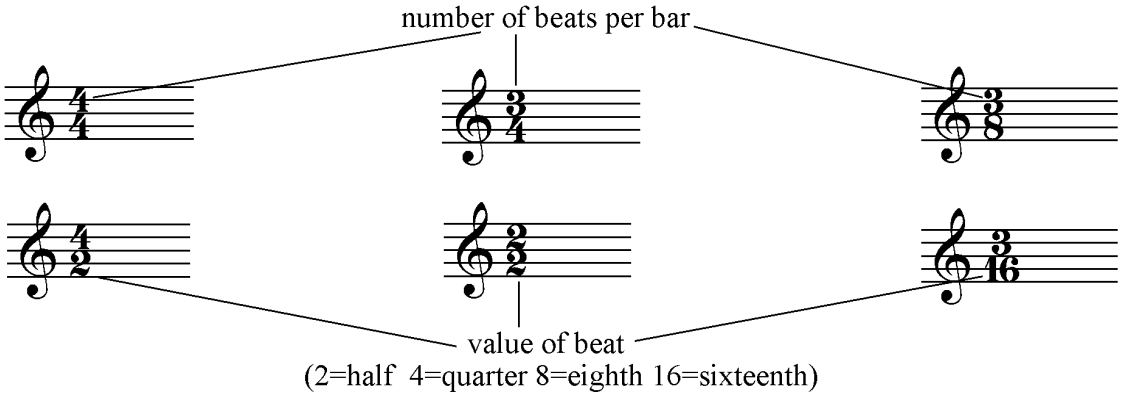
w), or four (S-w-s-w). **Measure** or **bar** refers to the unit or recurring pattern of strong and weak beats. In order to notate time in music, a note value (whole note, half note, quarter note, etc.) must be designated as representing the beat. This assignment is purely arbitrary, but conventionally the quarter note is most often used to represent the beat. In the examples below, a measure of two beats (S w) contains two quarter-note values, a three beat measure contains three quarter-note values, and so on.



If, for instance, we take a four-beat measure in which the quarter note gets the beat, durations encompassing two beats would be notated with half notes and a duration spanning the entire bar (all four beats) would be notated with a whole note. If the beats themselves are divided into shorter durations, the measure could be filled with eight (8) eighth notes, sixteen (16) sixteenth notes, and so forth. Note values of various types can occur in combination within the measure, provided the sum of the note values equals a whole note.



Information about the number of beats per bar and which note-value gets the beat is summarized in the **score** by the **time signature**. The time signature "decodes" the rhythmic notation for the performer. It contains two numbers placed on top of each other. The top number indicates the *number of beats* in each measure. The bottom number designates which *note value* gets the beat. While it is theoretically possible for a measure to contain any number of beats (top number), only whole notes, half notes, quarter notes, etc. can be assigned to the beat. Thus the bottom number is restricted to 1 (whole), 2 (half), 4 (quarter), and 8 (eighth). Occasionally 16th notes or even 32nd notes are used. The time signature is displayed on each staff to the right of the clef. If a piece contains only one metric pattern throughout, the time signature is placed at the beginning of the first **system**, and applies for the remainder of the piece.



An important aspect of **simple** meter is the tendency of the beats to divide in half. When counting a meter, **subdivided** beats between the start of full beats (the "**off-beats**") are given a neutral word or syllable such as "and" or "ta." For example, counting in 4/4 (**common time)**: "one-*and*-two-*and*-three-*and*-four-*and*…"

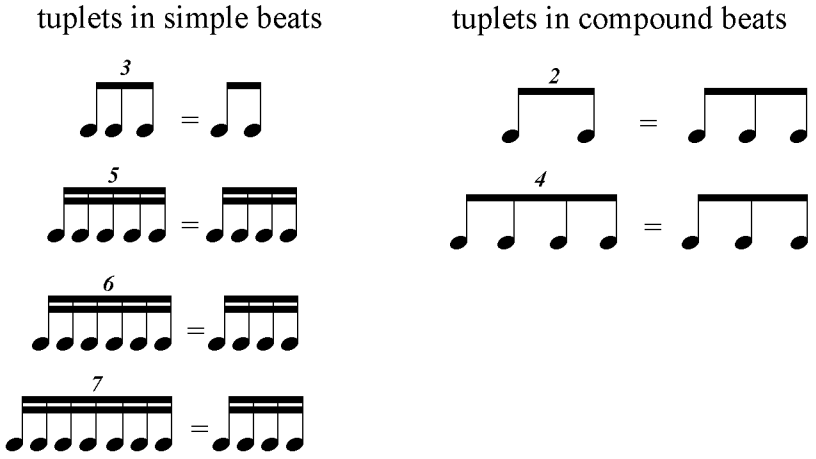
In some music, the pulse naturally divides into three subdivisions. Examples of widely known songs where this occurs are *Greensleaves*, *Home on the Range*, and *Silent Night*. Given the binary nature of note-value proportions, a special category of metric organization called **compound meter** is used to accommodate beats with a triple subdivision. Compound time signatures measure the number of subdivided beats in each bar. The bottom number reflects the note value of beat subdivisions while the top number designates the total number of *subdivided* beats. To determine the number of *beats* from the number of *subdivided beats* represented in the time signature, divide the top number by three. A compound meter with a top number 6 contains two beats, 9 contains three, and 12 contains four. Any note *value* can be indicated by the bottom number, but the top number must be divisible by three.

compound beats per bar:

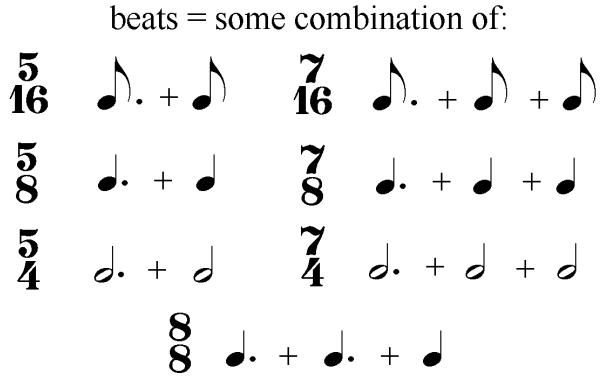
two	three	four	
6/16	9/16	12/16	beat = ♪.
6/8	9/8	12/8	beat = ♩.
6/4	9/4	12/4	beat = 𝅗𝅥.

Situations often arise where a subdivision of the beat is necessary that can't be accommodated by the division of note values indicated by the time signature. The most common example is the temporary division of two note values into three, or the **triplet**. Triplets are indicated with a bracket and a superscript "3". Four subdivisions can be recast as **quintuplets** (5), **sextuplets** (6), or ever **septuplets** (7).

Conversely, subdivided beats in **triple meter** can be recast as **duplets** (2) or **quadruplets** (4).

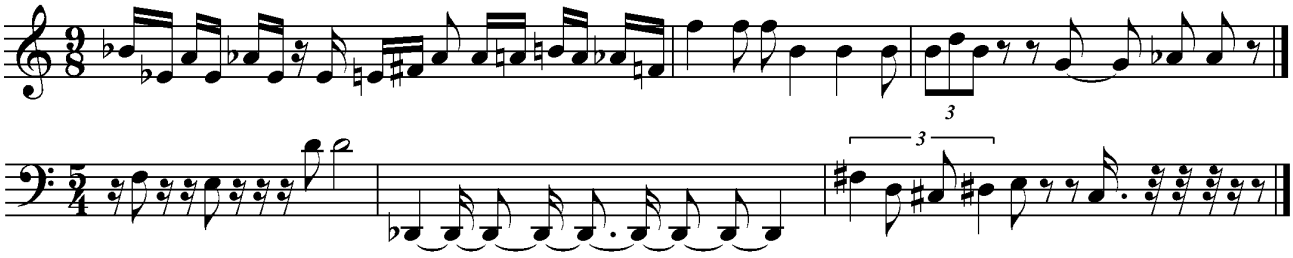


It is possible to combine simple and compound beats in the same measure. Though tuplets change the subdivisions within a beat, the subdivided notes become faster (or slower) without changing the rate of pulse. In **asymmetrical meter**, the changing number of subdivisions within the beat remain steady, thus the length between pulses changes. As with compound meter, the top number in the time signature indicates the number of subdivisions, not beats. How the subdivisions are grouped into beats are determined by the musical context. For instance, a measure of five subdivisions contains two unequal beats, but whether the first grouping contains two subdivisions and the second three or vice-versa can only be gleaned by observing **accents** or notational clues from the bar in question (such as through **beaming**). Once a pattern is established (such as 2+3, 3+2, 2+2+3, etc.), it is often maintained throughout the piece. But in music of the past 100 years, asymmetrical meters often change at any time, and may be juxtaposed with simple and compound meters. Common asymmetrical meters include:

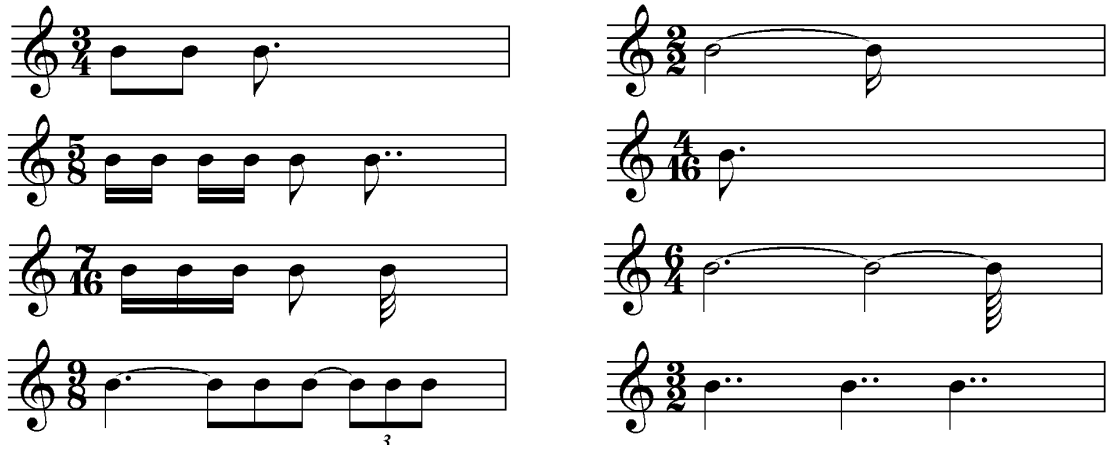


Lesson #2 Exercises

1) Draw lines through the staff to indicate the location of beats



2) fill in the missing time values:



3) short answer:

a. how many beats in a 12/8 measure?_____

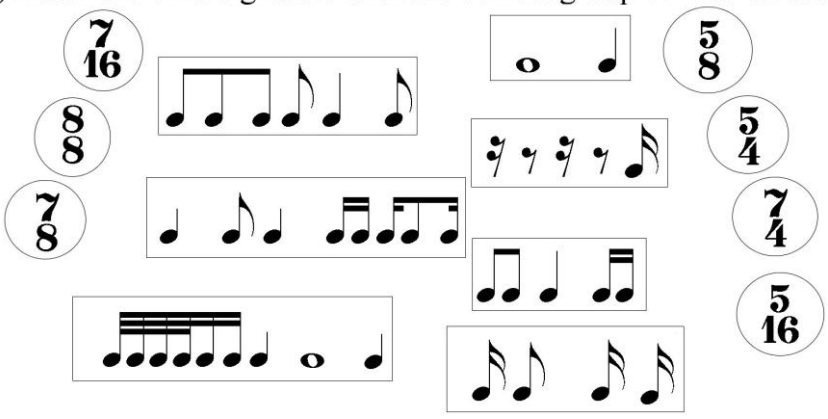
b. how many sixteenth notes in a 3/4 bar?_____

c. what value would be added to a whole note with *three* augmentation dots?_____

d. true or false: a 5/4 bar contains a sixteenth note, a whole note, and a dotted eighth_____

e. how many triplet 8th notes does it take to fill a 5/2 measure?_____

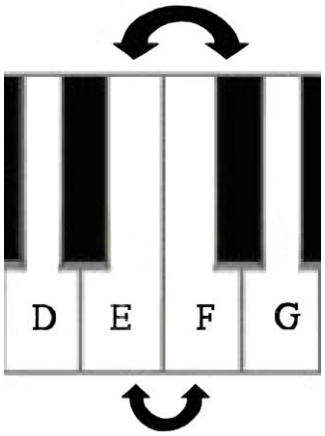
4) match the time signature with the correct group of note values



Lesson III: The Scale

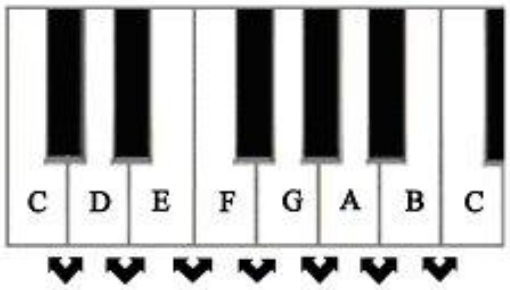
A **scale** is the division of the octave into a series of seven notes. The notes corresponding to the letter names of the staff match the white keys of the piano keyboard. This group of notes, the **diatonic collection**, serves as the basis for a variety of possible scales, depending on which note is defined as the **tonic**, or the fundamental note of a scale. As we observed earlier, some diatonic notes are adjacent and some are separated by black keys. When two notes are directly adjacent, the relationship or **interval** between them is a **half step**. If two diatonic notes are separated by a black note, the relationship between them is a **whole step**. These two relationships can be used to describe any two notes with adjacent letter names (and thus adjacent staff steps), whether the notes are part of the diatonic collection or not. For instance, E to F we know to be a half step because it does not contain an intervening black note. But if we add a sharp to the F, making it F#, we have altered the interval; F is now an *intervening* pitch between E and F#. Thus the relationship between E and F# is a whole step.

E to F# = whole step



E to F = half step

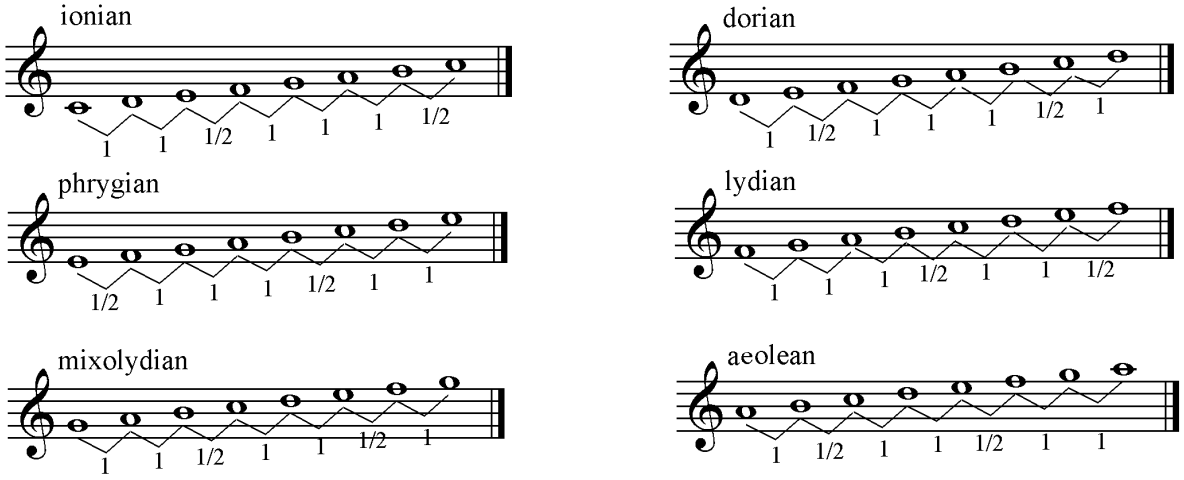
By beginning on any white key, and passing through every diatonic note until the octave is reached, we can observe a distinct pattern of half and whole steps. Beginning on C we get:



w w h w w w h

(1 1 ½ 1 1 1 ½)

If the process is repeated beginning with another pitch, a different pattern of whole and half steps is found. Though only one collection of notes is being used, seven distinct patterns arise depending on the note used as the tonic. Six of the seven scale patterns are generically known as **modes** (the scale built on B is disregarded because of its unstable harmonic quality). Elaborate modal systems are found in Medieval and Renaissance music. Modes are used today in some styles, such as Jazz and folk music:

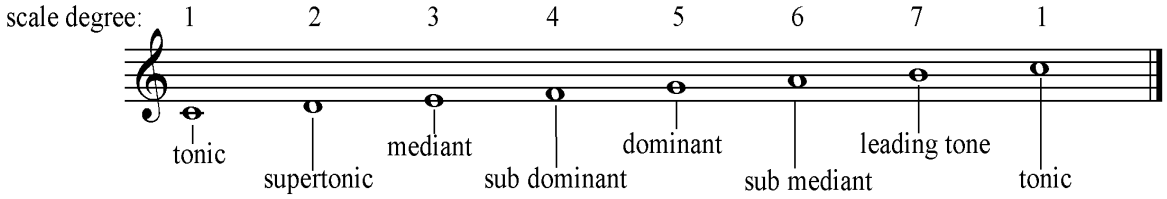


Scales are described both by their particular pattern of half and whole steps *and* by the letter name of the note functioning as the tonic of the scale. For example, because the dorian mode begins on "D," it is "D dorian;" phrygian is "E phrygian," lydian is "F lydian," and so forth. The reason for this convention is that it is possible to **transpose** the pattern of half and whole steps of a mode to another tonic note. This will require the use of accidentals (or the pattern of the scale will change). Thus many forms are possible of any of the modes. Using only the patterns of whole and half steps, a mode can be produced beginning on any note. This point will be expanded in depth in lesson IV.

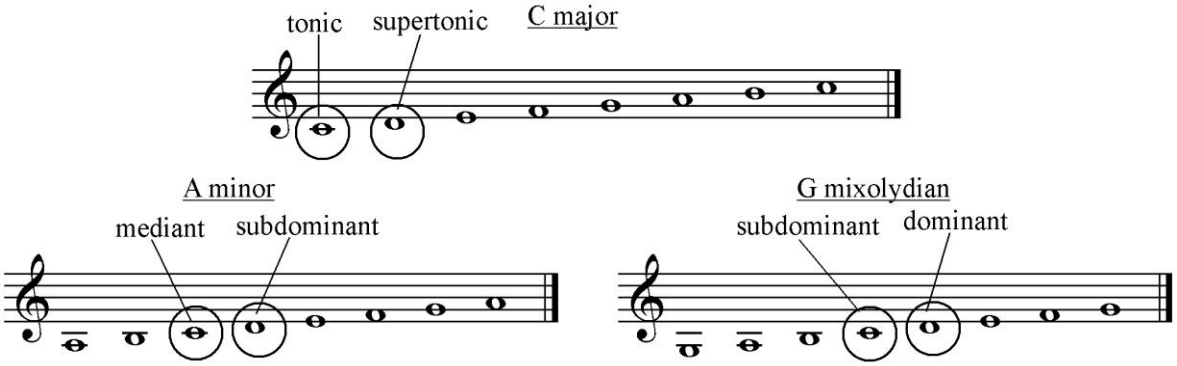
The tonal system that became preeminent in the common practice era essentially discarded every mode except the ionian and aeolian. In the tonal system, the ionian mode is referred to as the major scale, and the aeolian mode is known as the minor scale. The major and minor scales contrast significantly in their sound. Often, major scales are used to achieve brighter, more "optimistic" effects, whereas minor scales typically provide darker, more somber moods.

It is useful to differentiate between the various notes of the scale and the tonic note. Each **scale degree** can be designated by number. The tonic is scale degree 1, the note immediately above it is scale degree 2, and so on through the octave, which begins again at 1 (not 8). Descending, scale degree 1 is followed by scale degree 7, then 6, until scale degree 1 is reached an octave below. Each scale degree is also named.

Scale degree 1 is the **tonic**. From there in ascending order we have: **supertonic** (2), **mediant** (3), **subdominant** (4), **dominant** (5), **submediant** (6), and the **leading tone** (7).

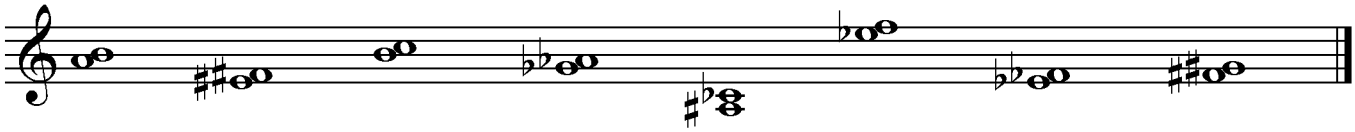


It is important to remember that scale degrees relate to a specified tonic note in a scale. Any note can function as any scale degree depending on the context of the scale. For instance, "C" is the tonic in the C major scale, but in the A minor scale "C" is the mediant. "D" is the supertonic in C major, but in G mixolydian "D" is the dominant.

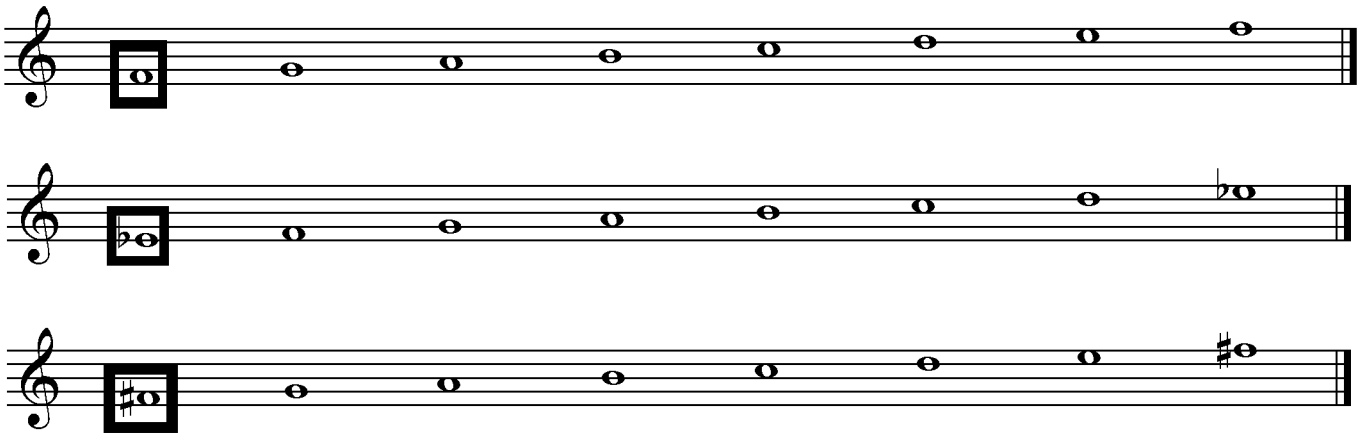


Lesson #3 Exercises

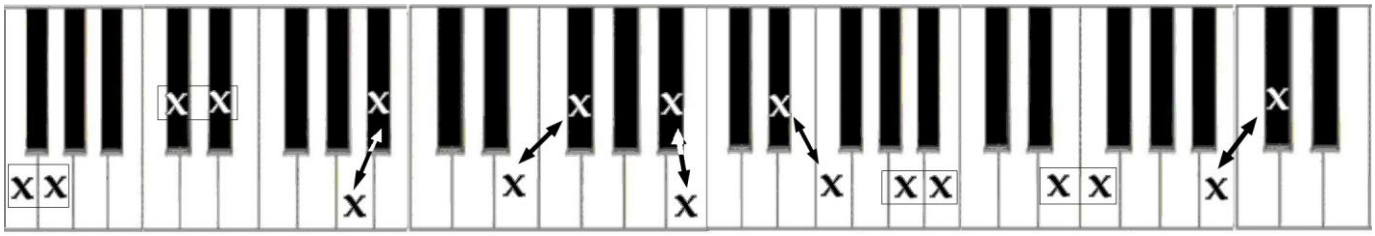
1) Whole or half step?



2) Alter the given scale with sharps or flats to match the pattern of whole and half steps produced from a C diatonic scale (w-w-h-w-w-w-h). Do not change the beginning note:



3) Analyze each note pair: whole or half step?



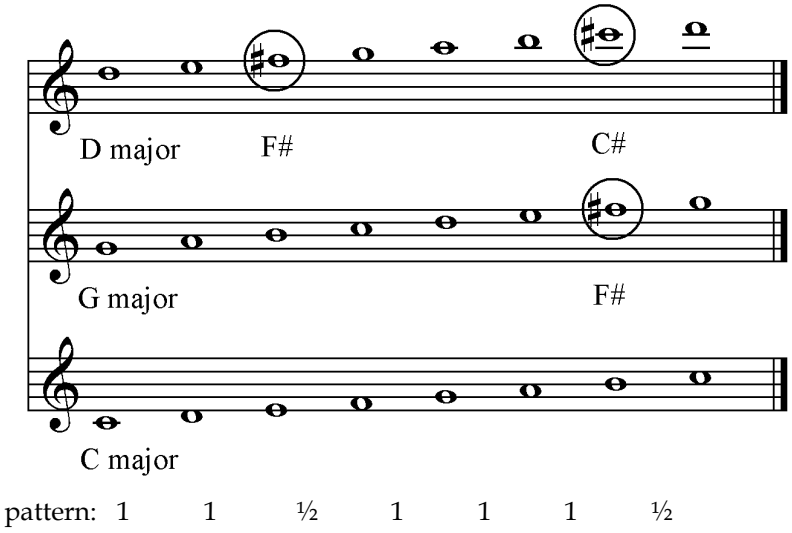
4) Whole or half step?

1. B-C		**6. F#-G#**	
2. G-G#		**7. E-Gbb**	
3. G-Gb		**8. A-B**	
4. G-Ab		**9. C-Db**	
5. G-F#		**10. A#-Cb**	

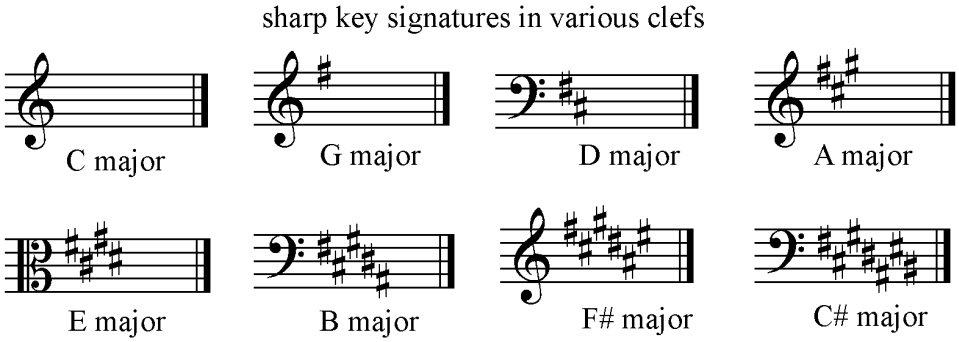
Lesson IV: Keys and Key Signatures

If "scale" means an ordered series of notes dividing the octave, then **key** refers to the basic relationship between a given scale and its functional deployment in a piece of music. Scales are classified by **key signature**. The key signature is a collection of sharps or flats found at the beginning of each system (directly after the clef but *before* the time signature). Sharps or flats in the key signature apply to the pitch of the indicated staff step in all octaves.

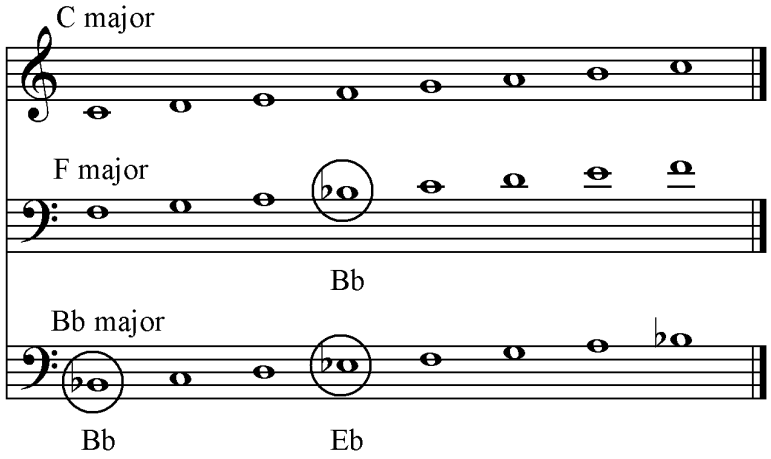
To begin, compare the C major, G major, and D major scales. In order to calibrate a scale based on G to match the pattern of major, the F must be raised to F#. For the D major scale, both F and C are raised. We can extrapolate from these three scales a consistent relationship that binds together all keys.



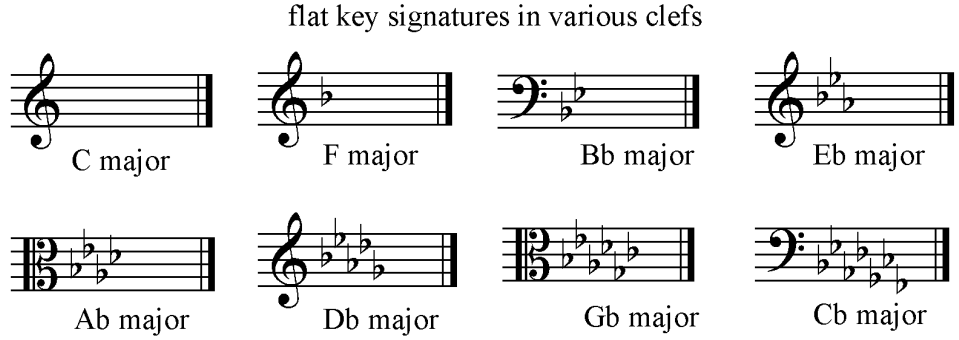
Notice that the tonic notes of all three scales are separated by five staff steps. By counting the number of *half steps* between C and G, and between G and D, the same number is arrived at: seven (or 4 ½ whole steps). The interval of five staff steps which contains seven half steps is the **perfect fifth** (refresh yourself on the difference between staff steps and half/whole steps). As the perfect fifth separates all three keys, and as G major requires F# and D major adds C#, it follows that the major key a perfect fifth up from D, which is A, will require *three* sharps. This process can be followed until we arrive at a key signature in which all scale degrees are raised (7 sharps). The order of sharps that accumulates with each fifth-related key is: **F-C-G-D-A-E-B**.



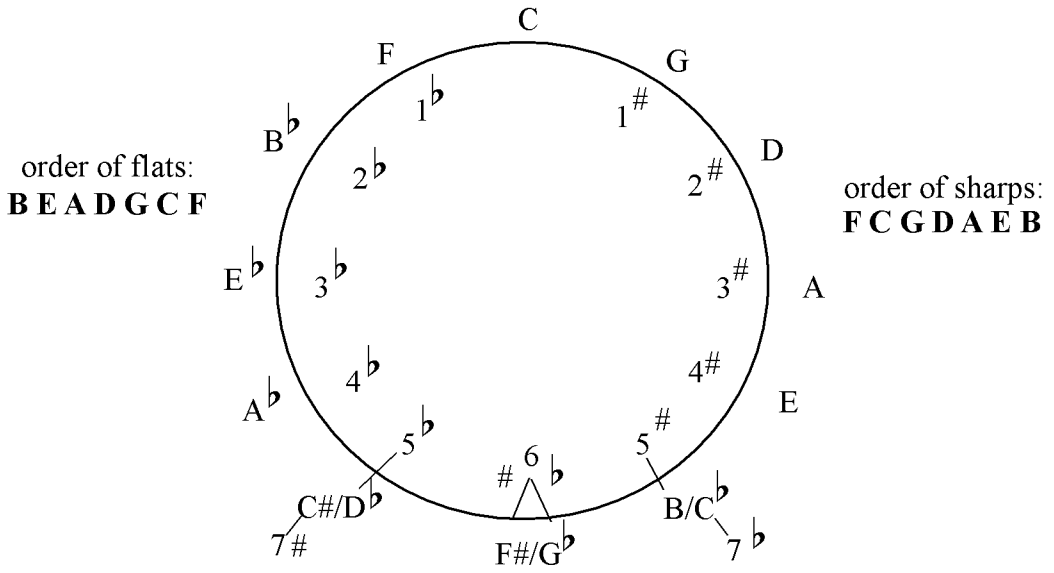
Consider what happens when major scales are written *down* from C by fifths:



The F major scale requires Bb, and just as the sharp keys adds an additional sharp for every scale a perfect fifth up, the flat keys add one flat for every perfect fifth *down*. The order of flats is: **B-E-A-D-G-C-F**. Note that the order of flats is the retrograde of the order of sharps.

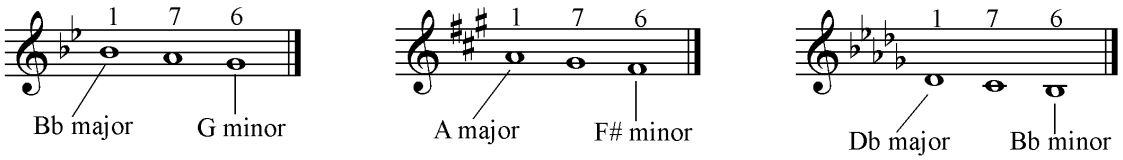


All the major keys can be represented on a diagram called the **circle of fifths**. "C" is placed at the top of the circle with sharp keys listed clockwise and flat keys listed counterclockwise. At the bottom of the circle, three of the sharp keys overlap with three of the flat keys. These are the **enharmonic keys**: those which use the same enharmonic pitches but with either flats *or* sharps.

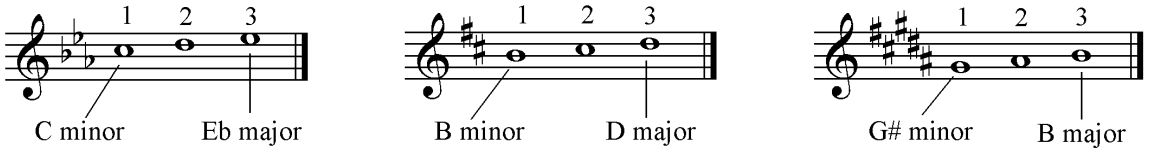


One of the most important fundamental steps to studying music is making sure that all the key signatures are memorized, and that you can play every scale at the piano with ease.

The minor keys use the same key signature system as the major keys. Every key signature that is used for a major key is used for a minor key as well. The trick is to understand the relationship between **relative keys**, that is, keys which share the same key signature. With C major and A minor, for instance, the tonic note of A minor is equivalent to scale degree 6 in C major. It follows that the relative minor of a major key is found by naming the 6th scale degree of the major scale. One way to do this is to simply count up the scale degrees until you reach 6. A faster way is to count *down* from the tonic (1-7-6). Ultimately, the best way of knowing the minor key signatures is to memorize them. But for now, the relative relationship between major and minor keys should be understood. Below are some examples of minor keys derived from a major key.

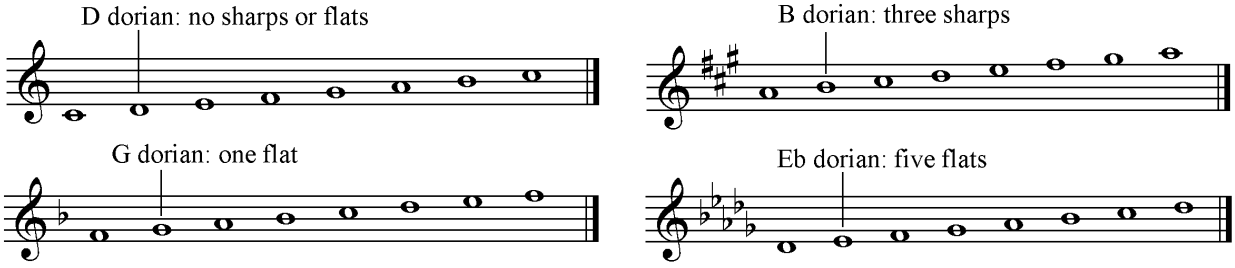


The reverse process is also possible, that is, the relative *major* can be deduced from a given minor key signature. As "A" is the 6th scale degree in the C major scale, "C" is the *third* scale degree in the A minor scale. So the relative major of any minor key can be found by counting up the scale to scale degree 3.



A short cut for finding the relative key signature is to imagine the tonic notes of relative keys separated by a **minor 3rd**. The bottom note of the interval is the minor tonic, the top note the major tonic. So to get the minor from the major, you go a minor 3rd *down*. To get the major from the minor, you go a minor 3rd *up*. Intervals will be covered in lesson V.

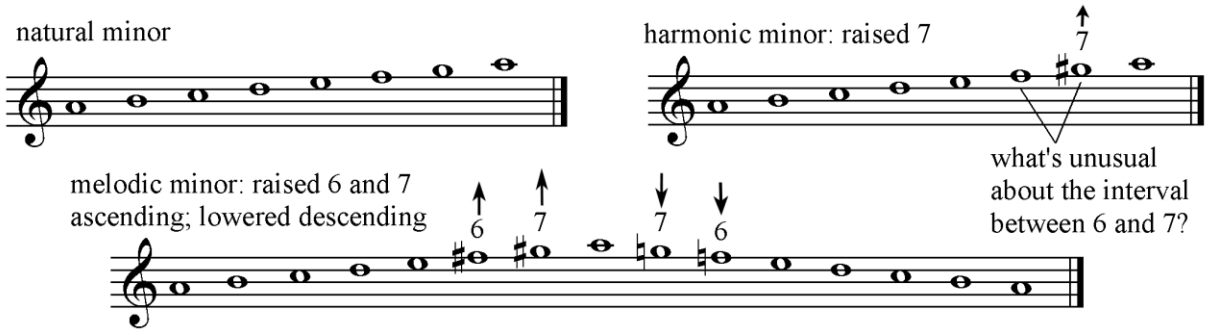
The concept of relative keys can be applied to the modes. As was discussed in the previous lesson, all of the diatonic modes can be understood in terms of their placement on the C major scale. The tonic of D dorian is equivalent to the 2nd scale degree of C major (or ionian). It follows that *all* dorian mode tonic notes are equivalent to the 2nd scale degree of some major scale. The *relative major* of a given dorian mode (and therefore the appropriate key signature) is the major scale with the dorian mode's tonic as its 2nd scale degree. For instance, the key signature for B dorian is the same as A major (three sharps), since B is scale degree 2 in A major. By reviewing the relationship between all the diatonic modes in terms of their placement on scale degrees in C major, the key signature for any mode can be found.



Another relationship between major and minor is the concept of **parallel keys**. Whereas relative keys share the same key signature but have different tonic notes, parallel keys have *different* key signatures yet share the *same* tonic note. It is easy to determine the parallel of any key; for instance, the parallel minor of C major is c minor and vice-versa. The complication lies in knowing what the parallel key signature is. A shortcut is available by applying a simple procedure to the key signature. The parallel minor key signature of any major key is found by "adding" three flats to the key signature. Given that C major has no sharps or flats, by adding three flats (B-E-A) to the key signature the parallel minor key signature is found. If the parallel major already has flats, then three *additional* flats are added. So the parallel minor of Bb major (2 flats) has *five* flats (B-E-A-D-G-C-F). Notice that when you reach a certain number of flats in the parallel major (more than four), there is no parallel minor key signature available, since there are only seven possible flats in a key signature. If the major key you are starting from has *sharps*, the equivalent action

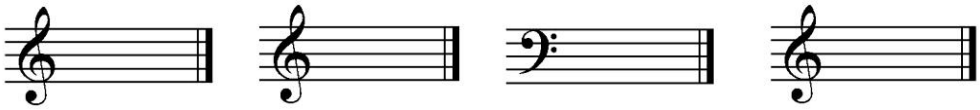
for adding flats is *subtracting* sharps. E major, for example, has four sharps in the key signature. By subtracting three sharps, the parallel key signature for E minor is deduced (one sharp). If the key signature has only one or two sharps, then a combination of subtracting sharps and adding flats is used. In the case of D major (two sharps), the two sharps are subtracted and *one* flat is added. With G major (one sharp), one sharp is subtracted and *two* flats are added. Inverting the process leads from the parallel minor back to the major. In that case three sharps are *added* (and/or flats are subtracted).

One final issue must be addressed regarding minor: certain scale degrees are often usually altered through the insertion of accidentals. These alterations are so consistent, in fact, that minor is frequently described in terms of three variant forms. The unaltered form of minor is **Natural minor**. In practice, scale degree 7 is usually raised, creating a half step between 7 and 1. This borrows the strong leading quality of major from 7 to 1. Represented as a scale, the form of minor with a raised 7th scale degree is **harmonic minor**. A third variant describes common melodic alterations depending on the direction of motion. Ascending melodic lines through 6 and 7 raise *both*, but when going down 6 and 7 revert to their natural form. This variant is called **melodic minor** (as it contains elements of the other two, melodic minor is in some sense the "true" minor scale).

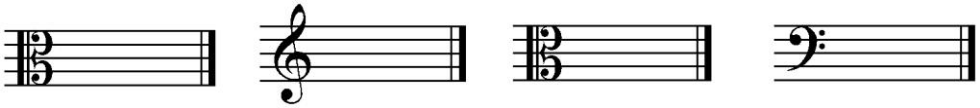


Lesson #4 Exercises

1) write the key signature:



B major **g minor** **Db major** **A major**



e minor **Cb major** **f minor** **a# minor**

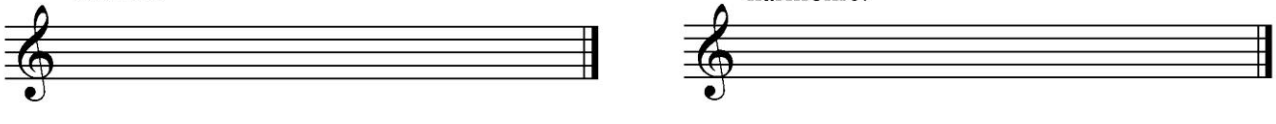
2) short answer:

a. the relative minor of D major is_____
b. the relative minor of Cb major is_____
c. the relative major of g minor is_____
d. to get the key signature for the parallel major, add three_____
e. to get the key signature for the parallel minor, add three_____

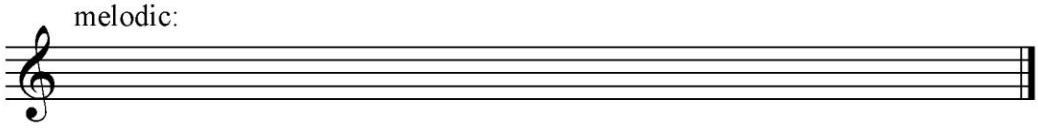
3) using accidentals, write out the three forms of the minor scale for the given keys:

d minor

natural: harmonic:

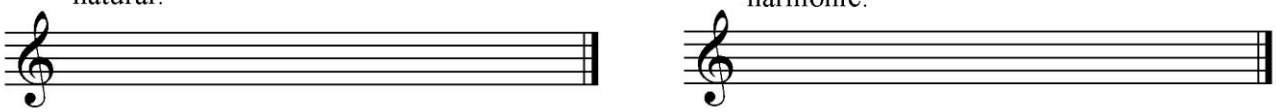


melodic:

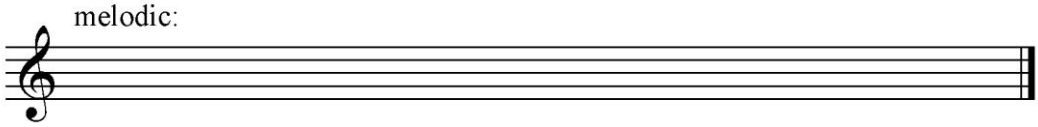


b♭ minor

natural: harmonic:

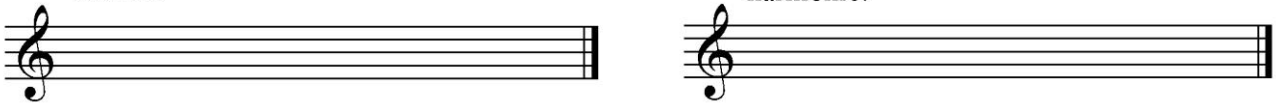


melodic:

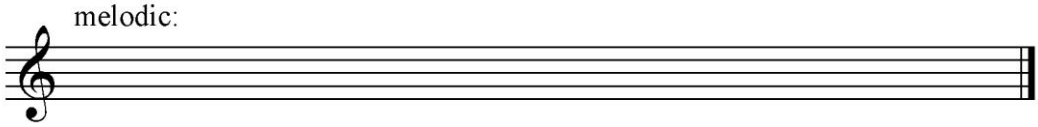


d# minor

natural: harmonic:



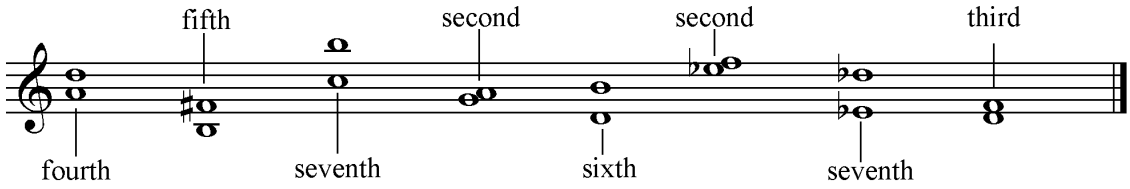
melodic:



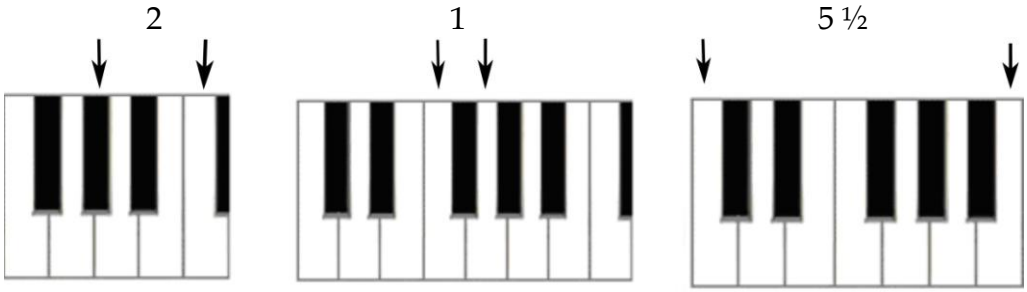
Lesson V: Intervals

An "interval" describes the relationship or distance between two notes. The two notes making up an interval can be **melodic**; they are played in succession. Or they can be **harmonic**; they sound together. There are two essential factors to describing intervals: 1) how they are "spelled" in terms of letter names or staff steps 2) how they "sound" in terms of whole or half steps. Initially, it might seem that these two factors are the same. But given the nature of our notation and tuning system, neither by itself provides enough information to adequately measure/describe intervals.

Measuring an interval in terms of letter names or staff steps is a simple process. We simply add up the number of letter names or staff steps between two notes. The important thing to remember is that the staff step/letter names of the notes in question are included in the tally. Thus, in describing the "distance" between A and C, we count A, B, *and* C. Three letter names/staff steps are counted, therefore the interval is a third. Some examples up to an octave:



If we take any of above intervals and add an accidental to one of the notes, we significantly alter the sound or **quality** of the interval, even though the staff-step distance remains intact. The potential for variability in quality among any two staff step notes requires the consideration of the precise number of whole or half steps between any two notes, regardless of spelling. To measure half steps, add up the number of *adjacencies* within the interval. Some find counting whole steps more efficient, the process being that one whole step is counted for every two half steps. In the case that an odd number is reached, ½ is added to the whole number. So 7 half steps is equal to 3 ½ whole steps. Some examples:



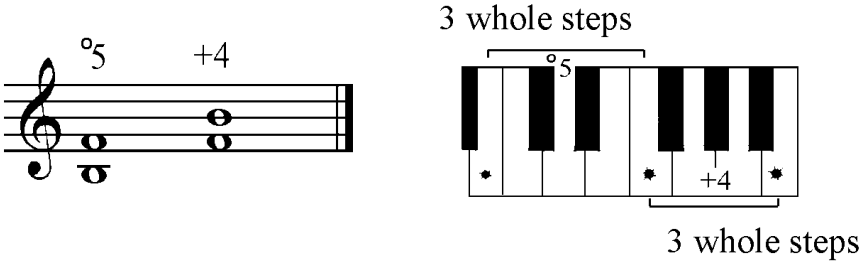
Measuring the absolute relationship between notes isn't entirely satisfactory as a means of describing intervals because enharmonic spelling opens up the possibility of two identically sounding intervals to be notated with different distances in terms

of staff steps. For instance, Cb to Eb and B to Eb may sound exactly the same, but C to E is a third and B to E is a fourth. So the system of intervals distinguishes between these two situations. Thus, there is a great deal of potential for enharmonic overlap of intervals.

There are typically two potential *qualities* for each staff-step interval. Seconds are comprised of either a half step or a whole step, thirds of either 1 ½ or 2 whole steps, an so on. The chart below summarizes these possibilities through the octave.

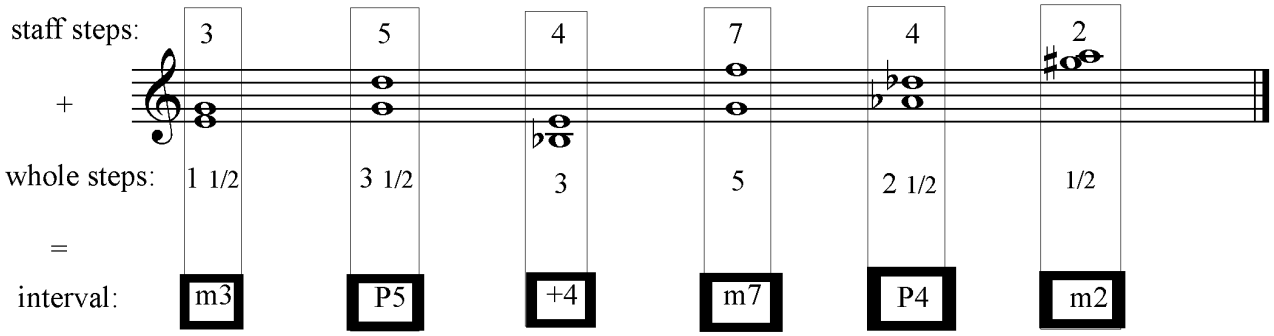
Interval	**Staff Steps**	**Whole Steps**
minor 2nd	2	½
major 2nd	2	1
minor 3rd	3	1 ½
major 3rd	3	2
perfect 4th	4	2 ½
augmented 4th	4	3
diminished 5th	5	3
perfect 5th	5	3 ½
minor 6th	6	4
major 6th	6	4 ½
minor 7th	7	5
major 7th	7	5 ½
perfect octave	8	6

The column on the left indicates the quality of the interval resulting from the correspondence between a particular configuration on staff steps and whole steps. When describing an interval, the quality and number of staff steps are used together (first two columns). For instance, the first interval on the chart is a minor 2nd, the next is a major 2nd, and so forth. Notice that the **augmented** 4th and the **diminished** 5th actually contain the same number of whole steps (3). This has to do with a property inherent in the diatonic collection whereby the interval of an augmented fourth can be **inverted** to produce a diminished fifth without changing the number of whole steps between the notes.



Most intervals can be identified with reference to the interval chart. The relationship between notes is evaluated in terms of the second and third columns. By

determining *both* the number of staff steps *and* the number of whole steps of a given interval we can come to a determination of its interval. Examples:



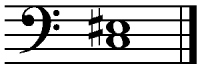
Intervals are comprised of a top note and a bottom note. If the two pitches are inverted, another interval is produced. For instance, C up to E is a major 3rd, but E to C is a minor 6th. If the initial interval is C to Eb (a minor 3rd), the inversion Eb to C is a major 6th. In fact, no matter what the interval, its inversion will follow a consistent pattern: 2nd's invert to 7th's, 3rd's invert to 6th's, and 4th's invert to 5th's. Beyond the 4th the reverse is true: 5th's invert to 4th's, 6th's to 3rd's, and 7th's to 2nd's. Interval qualities also invert consistently. Major intervals invert to minor and vice-versa, augmented intervals invert to diminished and vice-versa; but perfect intervals remain perfect. Note the symbols that are used to characterize interval quality: m = minor, M = major, P = perfect, + = augmented, and o = diminished.

For the purpose of analyzing intervals, knowing how intervals invert is helpful for analyzing larger intervals such as 6th's and 7th's. Instead of analyzing F up to D, for example, we can analyze D up to F, which is a minor 3rd. Since thirds invert to sixths and minor inverts to major, we can be absolutely confident in knowing that F to D, then, is a major 6th.

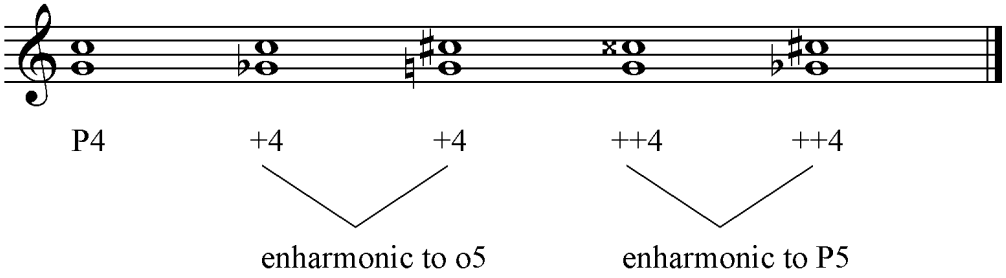
There are other short cuts for analyzing intervals. One method is to think of the interval without any sharps or flats first, and then determine how the addition of the accidentals alters the interval. Another compares the bottom note of an interval with the tonic note of a major scale. In the major scale, the tonic could be paired with each scale degree to form an interval (1 & 2, 1 & 3, 1& 4, etc.). It turns out that all of the intervals produced in this way are either Major (2nd, 3rd, 6th, 7th; or perfect (4th, 5th, 8ve). Lets assume the interval being analyzed is some kind of 6th. If the top note of the interval would be scale degree 6 in the major scale of the bottom note, then the interval must be a major 6th. If, however, the top note is a half step lower than what would be scale degree 6, it must be a minor 6th. Practicing intervals using this short cut is an excellent way to not only be comfortable with analyzing intervals but also with becoming facile at thinking in keys. If you practice analyzing intervals enough,

you will eventually be able to recognize them instantly, without even thinking about it.

You may have noticed that the interval chart above doesn't account for every possible interval that can occur between two notes. Consider the interval below:

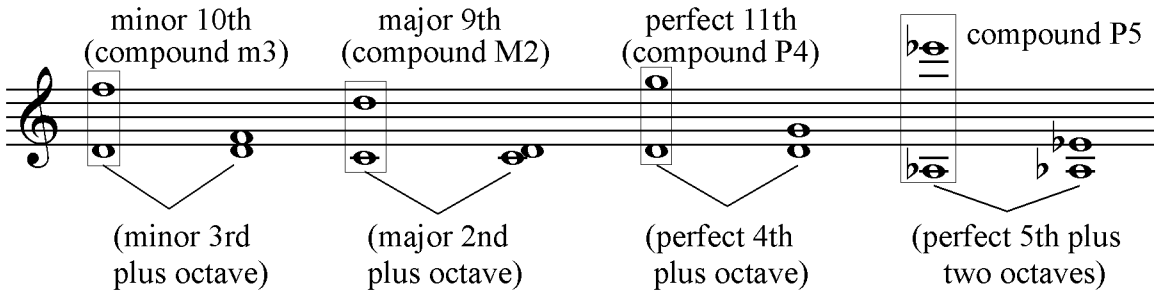


This interval is clearly a third of some kind, but an analysis of the whole steps produces the number 2 ½. Though there is no place for this interval on the chart, we can use the chart as a starting point for figuring out anomalous intervals such as this. The trick to this is to recognize first that the staff step interval "trumps" everything else. The interval above is some kind of third regardless of how many whole steps it contains. Once we determine the staff steps, we compare the number of whole steps with the possibilities listed on the chart. Thirds list 1 ½ (minor) and 2 (major) as possible numbers of whole steps. Because the interval C to E# has 2 ½ whole steps, it is a half-step *larger* than the major 3rd. When an interval is altered to be larger than what is accounted for on the chart, it becomes augmented. If it is smaller than the interval on the chart, it is diminished. Unlikely, but possible, are intervals that are a *whole step* larger or smaller than what is on the chart. Instead of being augmented or diminished, these would be *doubly augmented* or *doubly diminished.* And we could go on and on from there. Now, in the case of intervals that are augmented or diminished on the chart, we use the same logic. An augmented 4th expanded by a half step is doubly augmented, a diminished 5th contracted by a half-step is doubly diminished.

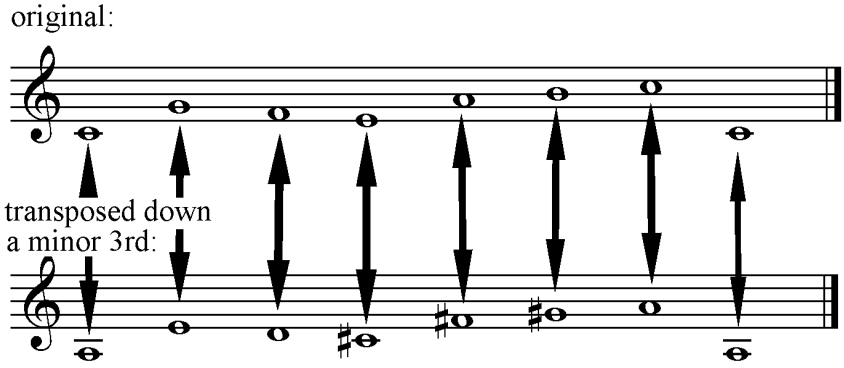


Intervals larger than an octave are called **compound intervals**. The most straightforward approach to analyzing these is to transpose the top note down by octaves until it is within an octave of the bottom note (without crossing over). This interval can be analyzed normally and then the number of octaves it took to bring the top note down would be accounted for. We could say, for instance, a "major 3rd plus an octave," or a "perfect 5th plus three octaves." It is also common to continue the numbering of staff-step intervals beyond 8 to 9, 10, 11, and so on through 15 (two octaves). The best way to approach these intervals is treat them as if within an octave first, and then account for the octave. The possible intervals of 9th's through

15th's are the same as those on the chart. 9th's and 10th's can be major or minor, 11th's can be perfect or augmented, and so on.

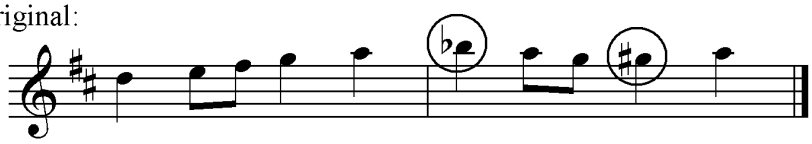


An understanding of intervals gives us all kinds of practical tools we will use every day as musicians. One of those tools is the ability to **transpose** music from one pitch level to another. For instance, if we have a melody that we'd like to sound higher to fit the range of a particular instrument, we can determine a suitable interval, and then transpose each note of the melody.

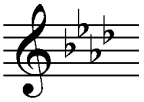


We can also transpose from one key to another by transposing the key signature. As B is a major third up from G, the key of B major is a major third up from G major. It follows that by transposing the key signature, the only remaining process is that of moving the notes by the same factor of staff-steps (considerably easier than reproducing the precise interval for each note). If there are any accidentals present in the original version, these should be accounted for last. But remember, it isn't adequate to simply move accidentals from the original into the transposed version. What matters is the *effect* of the accidental, not the accidental itself. For example, a note can be raised by a half-step using a sharp. But if we wanted to raise a flat note a half step a natural is used. So the context must be considered when accounting for accidentals.

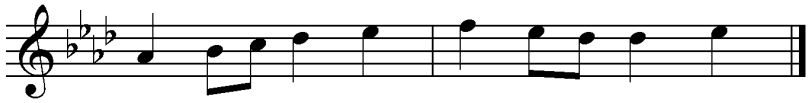
original:



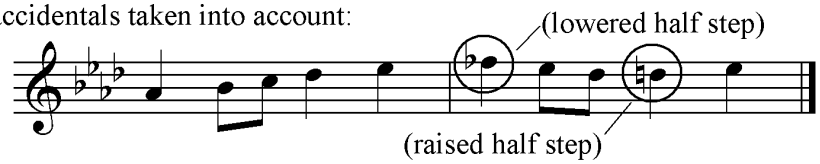
key signature transposed down an augmented 4th (D to A flat):



notes added a fourth down:

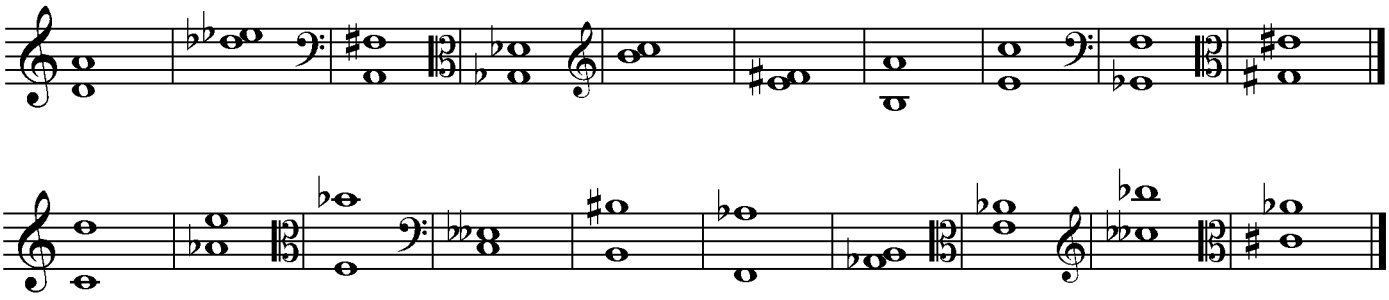


accidentals taken into account:

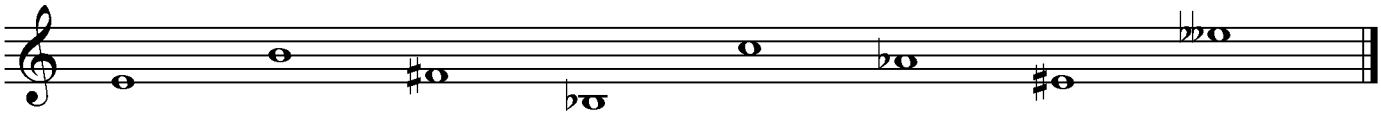


Lesson #5 Exercises

1) analyze the interval:

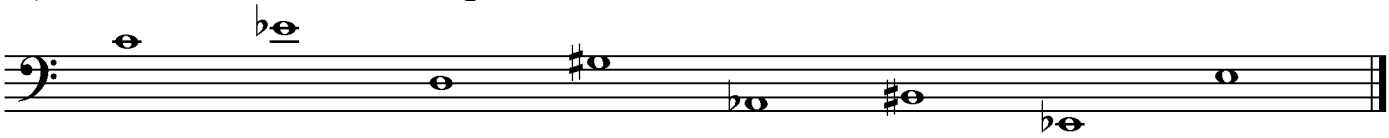


2) write the interval *above* the given note:



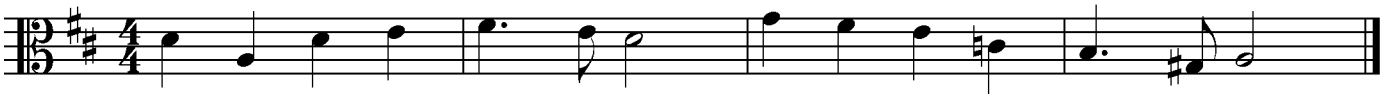
P4 M3 m6 M9 +3 m7 P5 +8

3) write the interval *below* the given note:

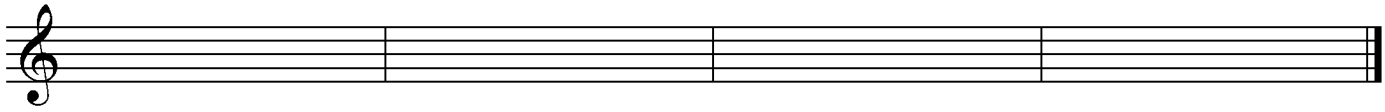


m6 P12 +4 P5 M3 m3 m2 m7

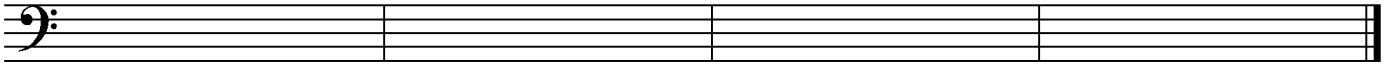
4) transpose the melody; display the new key signature and account for any accidentals:



a) *up* a minor 3rd:

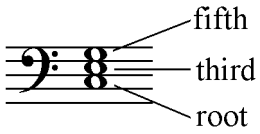


b) *down* a minor 7th:



Lesson VI: Triads and Seventh Chords

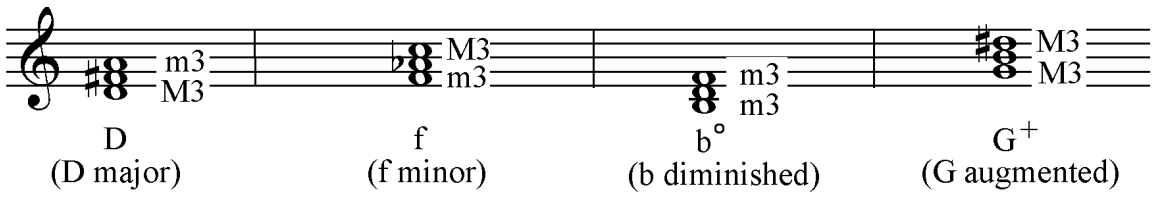
Harmony in music refers to the functional simultaneity of sounds. Tonal music relies on the **tertian** principle, which builds harmonies by configuring notes into clusters of major and minor thirds. The most basic tertian entity is the **triad**, which is a simple construction of three notes conjoined by major and minor thirds. The three notes of the triad, from the bottom up, are referred to as the **root**, **third**, and **fifth**.



The intervals between the root and the third, and between the third and the fifth determine the quality of the triad. As there are two intervals in a triad, either of which can be minor or major 3rd's, four possible triads exist.

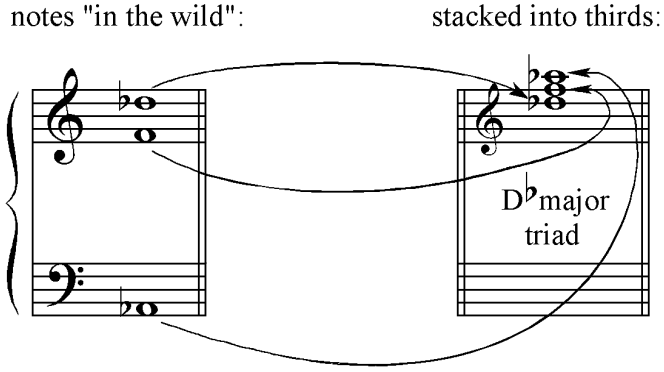
diminished	**minor**	**major**	**augmented**
m m	M m	m M	M M
o	**m**	**M**	**+**

The bottom letter corresponds to the bottom interval of a triad, while the top letter corresponds to the top interval. There is a rationale for the names of the four triad types. Though there are only minor 3rd's between consecutive notes in the diminished triad, there is a diminished 5th between the root and the fifth. It is the diminished 5th that gives this triad its unique sound. Similarly, the interval between the root and 5th of the augmented triad is an augmented 5th. The minor and major triads share their properties with the **tonic triad** of minor and major scales respectively. When analyzing triads, the quality is used in connection with the letter name of the root. Usually the upper case letter is used for major and augmented triads, while lower case is used for minor and diminished triads. Some examples:

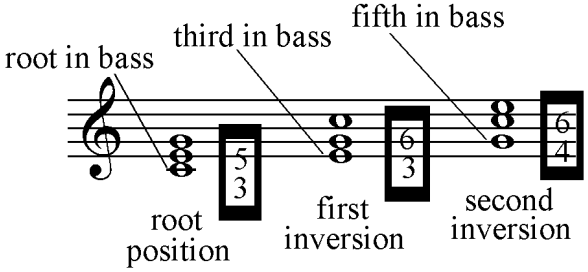


When triads occur in music, they don't necessarily appear neatly stacked in thirds. The first order of business for analysis is to configure the notes as they would lay out in consecutive thirds. This may be done either in one's head or written down.

Once all the notes are accounted for and stacked into thirds the business of identifying the root, third, fifth, and the quality of the triad can begin.



A final step in analyzing triads is to identify the lowest sounding note. In musical contexts, the lowest sounding note, or the **bass note**, isn't necessarily the root of a given triad. To properly analyze a triad, its root *and* its bass note must be described. Where the root is in the bass, the triad is in root position. If the third is in the bass, the triad is in **first inversion**. If the fifth is in the bass it is in **second inversion**. The numbers to the right of each inversion listed below refer to how they are typically described in traditional **figured bass** notation and also for analytic purposes. Instead of writing out "triad in second inversion," writing $\frac{6}{4}$ instead is understood to convey the same meaning.

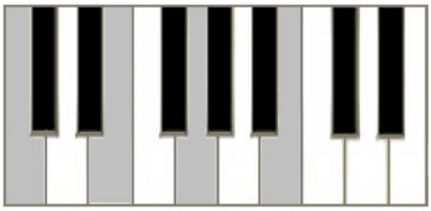


Another conventional type of **chord,** the **seventh chord** is comprised of four notes instead of three. Like triads, seventh chords are constructed with consecutive thirds. So in addition to the root, third, and fifth, a *seventh* is added. To systematically consider the possible seventh chord qualities, we place a minor and a major third above each type of triad. Only a minor 3rd can be added to the augmented triad because the result of adding a major 3rd is an enharmonic octave with the root. All told, there are seven possible seventh chords.

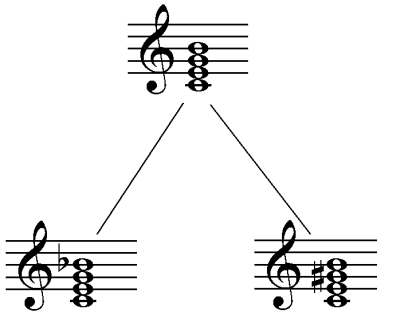
fully diminished	**half-diminished**	**minor**	**minor-major**	**major-minor (V7)**	**major**	**augmented**
m	M	m	M	m	M	m
m	m	M	M	m	m	M
m	m	m	m	M	M	M
o7	**ø7**	**m7**	**mM7**	**Mm7 (V7)**	**M7**	**+7**

If we relate the 7th chord types to the diatonic seventh chords built on the tonic in major and minor, two distinct groups emerge: those more like I7 in major (M7, V7, +7), and those more similar to i7 in minor (m7, mM7, o7, ⌀7).

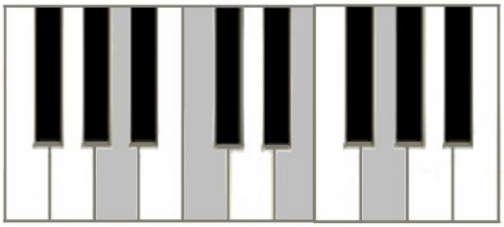
I7 in C major:



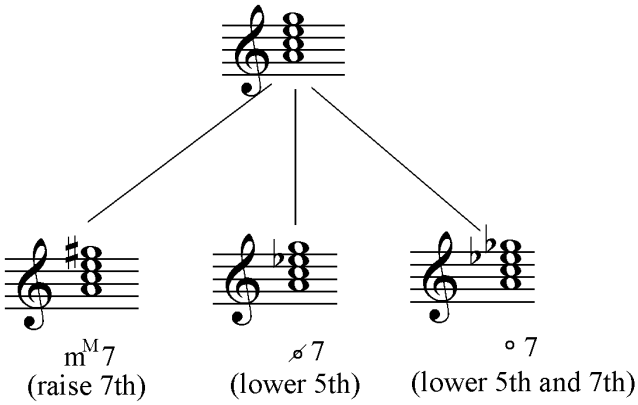
M7 (I7 in major)



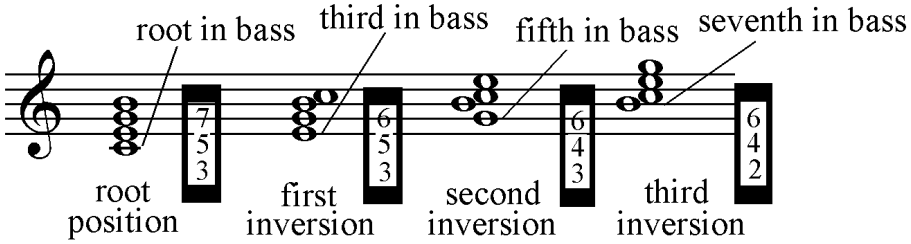
i7 in A minor:



m7 (i7 in minor)



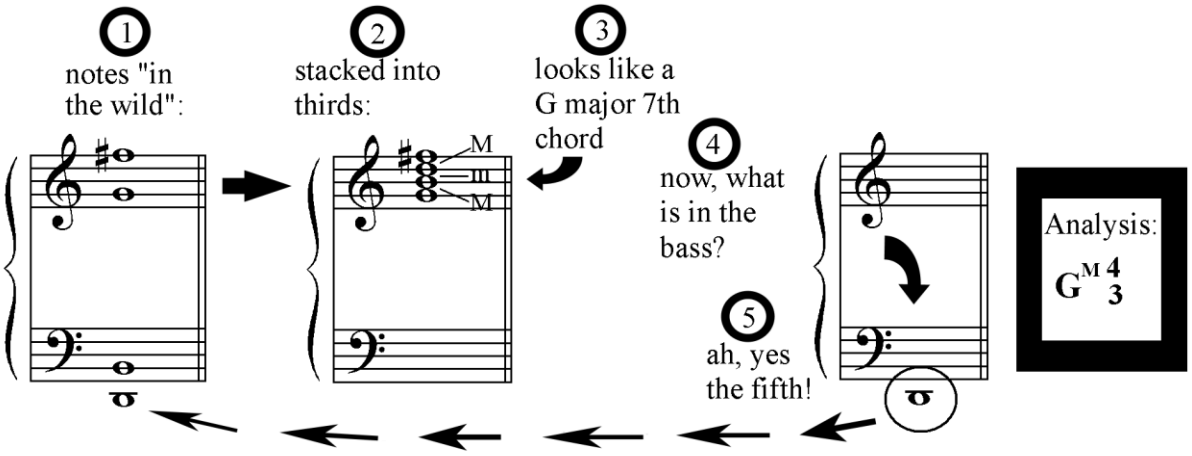
As with triads, analysis of seventh chords usually begins with deciphering the configuration of thirds between notes. Once the quality and root are determined, identifying the bass note is the final step. As there are four notes in a seventh chord, there is now the possibility for **third inversion**, where the 7th of the chord is in the bass.



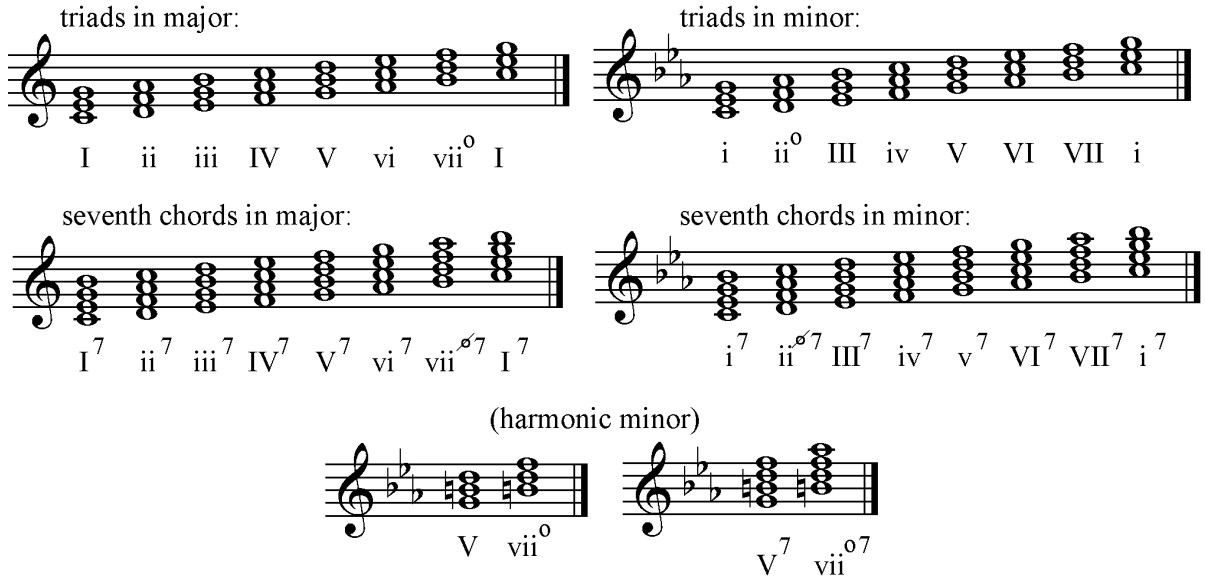
Though inversions of triads and seventh chords are usually represented by numbers indicating the configuration of intervals, these figures are shorthanded so that they are easily remembered and less confusing. The assumption when no numeric designation is given is that the chord is a root position triad. Since a different set of numbers is used for triads as is used for seventh chords, the figured bass numbers indicate not only the chord position, but whether the harmony is a triad or seventh chord.

	r. p.	1st inv.	2nd inv.	3rd inv.
triads		**6**	**6** **4**	**n/a**
7th chords	**7**	**6** **5**	**4** **3**	**4** **2**

Using all of this information the root, quality, and position of any triad or seventh chord can be analyzed.

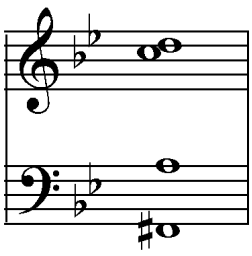


The final task of this lesson is to combine our understanding of triads and seventh chords with what we know about keys and scales. The easiest way to do this is to build triads and seventh chords on each scale degree in both major and minor. We can assume that chord qualities existing in one key will map out exactly the same in all the others. The one additional task is to relate a given chord to the scale in which it resides. We do this by substituting *scale degree* for note name in describing its root. A scale degree implies a contextual relationship to a key and, ultimately, to a network of functional harmonic conventions. Describing a root/chord in terms of scale degree means that its identity depends on the identity of the entire key structure. And that very relationship has a tremendous effect on the quality of the chord. Though there are three major triads in the major scale, for instance, because of the different relationship of each to the scale, they embody strongly different aural qualities. Below are all the triads and seventh chords in major and minor using **roman numerals** instead of letter names to indicate root. Notice that upper and lower case roman numerals are used to describe M/+ (upper) and m/o (lower).



When analyzing a chord within the context of a key, first determine how the notes of the chord can be arranged into thirds. Second, identify whether the chord is a triad or seventh chord and what its quality is. Third, convert the root of the chord into a scale degree (scale degree 5 becomes V, for instance). This, in conjunction with the chord quality, determines the roman numeral and its case, or if any additional symbols are required to indicate half/fully diminished or augmented. Fourth, determine which chord degree (root, third, fifth, or seventh) is in the bass. Based on this apply the appropriate figured bass number to show the chords position.

in g minor:



1) arrange in thirds (bottom up):
D-F#-A-C

2) type and quality of chord:
M^{m7}

3) root "D" converted into a scale degree in g minor:
V

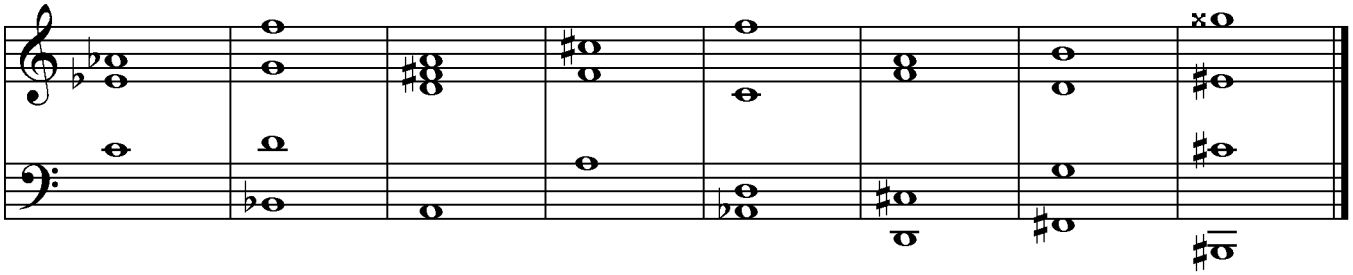
4) F# (the third) is in the bass (1st inversion), thus the analysis is:

V^{6}_{5}

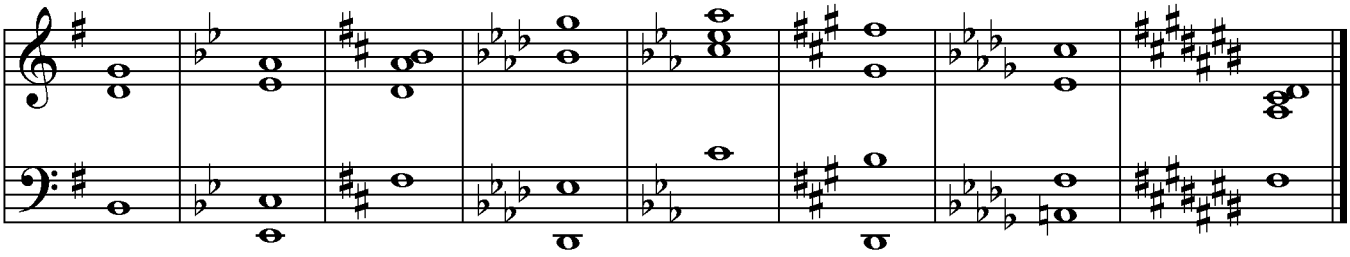
(upper case V with a seventh chord designation is understood to convey the quality of a major-minor seventh)

Lesson #6 Exercises

1) analyze the chord (no key given):

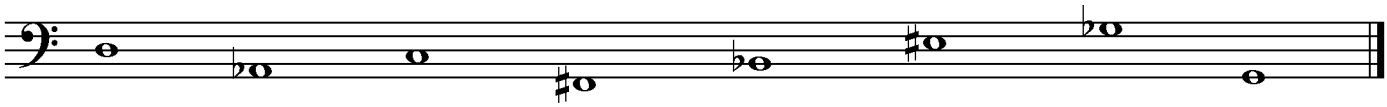


2) analyze the chord within the given key (use roman numerals):



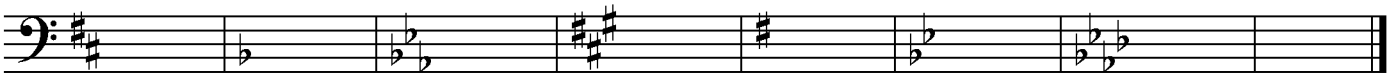
G: g: b: f: Eb: c#: b♭: C#:

3) write the chord above the given bass note:



M6/4 mM7 ø4/3 Mm4/2 m6/5 +7 o6 m(5/3)

4) write the chord within the given key:



D: V d: V4/3 c: viio A: viiø4/2 e: iio6 g: v f: V4/2 C: IV7

Appendix: Glossary of Terms

accent: stressing or emphasizing a note or chord through increased dynamic or duration

accidental: the sharp (#), flat (♭), and natural (♮) symbols used to raise or lower a note

asymmetrical meter: a meter containing both simple and compound beats

augmentation dot: a dot placed to the right of a note-head which increases the duration of the note by 50%

bar: the grouping of time values established by the time signature (see also **measure**)

bass: the lowest sounding note of a chord

beam: a line (or lines) used in the place of flags to group 8th, 16th (and shorter) note values

beat: the sensation of regular points of emphasis in music (see also **pulse**)

chord: a sound consisting of more than one note

clef: the notational device orienting the staff to a particular range of pitches (e.g. *treble, bass,* and *alto* clefs)

circle of fifths: a graphic representation of the relationship of all keys by perfect fifths

common time: indicates 4/4 time (the letter **"C"** is used instead of 4/4)

compound interval: an interval larger than an octave

compound meter: a meter in which the beat regularly subdivides into three

diatonic: referring to notes found within a given scale or key

diatonic collection: generally used to describe the letter-named or *white* notes

duple meter: meters containing a number of beats divisible by 2

dynamic: the relative volume of music indicated by Italian abbreviations (***f***=loud [*forte*], ***mf***=moderately loud [*mezzo forte*], ***mp***=moderately soft [*mezzo piano*], ***p***=soft [*piano*])

enharmonic equivalence: the attribute of a single *sounding* pitch notated with different letter names (e.g. F and E#)

enharmonic keys: flat and sharp keys with enharmonically equivalent notes

figured bass: the practice of using numbers below a given bass line to signify harmony

frequency: cycles per second (hertz) of a sound wave

grand staff: a conventional score layout consisting of two staves (the upper using treble clef, the lower using bass clef); typically used for piano scoring

half step: the relationship of immediately adjacent pitches

harmonic minor: a form of the minor scale in which scale degree 7 is raised by a half step (forming the leading tone)

harmony: refers to the "vertical" aspect of music; also used in connection with the *functions* of chords within a key

interval: the vertical measurement between two notes

inversion: the operation of exchanging the top and bottom notes of an interval while keeping the note names intact; also used to describe the bass-note configuration of triads and seventh chords

ledger line: short lines used to extend the range of a staff

key: the operant scale and tonic of a piece (or section of a piece)

key signature: sharps or flats placed at the beginning of every staff and system governing the key

major: describes the quality of a particular type of triad; also used to describe the tonal scale in which the tonic triad is major in quality

measure: the grouping of time values established by the time signature (see also **bar**)

melodic minor: a form of the minor scale in which scale degrees 6 and 7 are raised by a half step in ascending melodic passages

melody: a succession of connected tones

middle C: the particular octave of the note **C** which symmetrically divides the grand staff

minor: describes the quality of a particular type of triad; also used to describe the tonal scale in which the tonic triad is minor in quality

mode: generally refers to the seven possible scale patterns within the diatonic collection

natural minor: the minor scale expressed without any altered notes

note: designates a relative frequency within a harmonic system; also used to describe notes related by octave (see **pitch** or **tone**)

parallel keys: keys with *different* key signatures sharing the same tonic note

pitch: the specific frequency of a given sound; may also be used to describe notes related by octave (see **note** or **tone**)

pulse: the sensation of regular points of emphasis in music (see also **beat**)

range: pertains to the distance between high and low

relative keys: keys with the *same* key signature but different tonic notes

rest: notational symbols designating the duration of silence

root: the fundamental note of a chord; the lowest note of a chord when spelled in thirds

root position: a triad or seventh chord sounding with its root in the bass

scale: a linear arrangement of seven consecutive tones

scale degree: the relation between a note and the scale in which it functions

score: the medium (usually a manuscript) for transmitting musical notation

seventh chord: four notes built from thirds

simple meter: meters in which the beat subdivides in two

staff: the arrangement of 5 lines on which notes and rests are placed

staff steps: lines and spaces on the staff upon which notes are placed

subdivision: the inherent division of the pulse two (simple) or three (compound)

tempo: rate of pulse

tertian harmony: the underlying configurability of simultaneous tones into thirds

time signature: indicates 1) the number of beats per measure and 2) the note value of the beat

tone: the specific frequency of a given sound; may also be used to describe notes related by octave (see **note** or **pitch**)

tonic: the fundamental tone of a scale or key

tonic triad: a triad containing the tonic note as its root

tonal: music based on a major or minor scale

tone: the specific frequency of a given sound; may also be used to describe notes related by octave (see **pitch** or **note**)

transposition: the process of shifting notes up or down by a consistent interval

triad: a three-note chord built from thirds

triple meter: meters with three beats per bar

triplet: the grouping of three notes within a two-note division

whole step: the relationship between two notes separated by two half steps