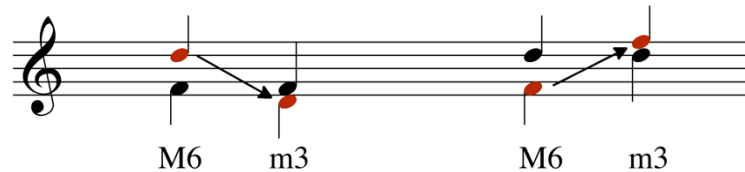


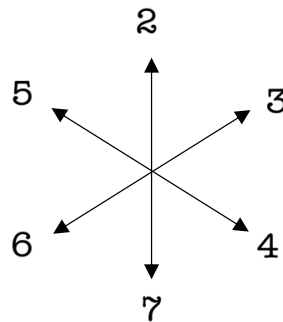
Sixths and Sevenths

Interval inversion (review)

An interval is **inverted** when the two notes are flipped, the lower moving up an octave, or the higher moving down an octave.



An interval and its inversion together always make an octave. So an interval's number and its inversion's number always add up to **9**. (Not 8! Interval arithmetic is funky, because we count both ends of an interval.) Seconds invert to sevenths, thirds to sixths, and fourths to fifths.



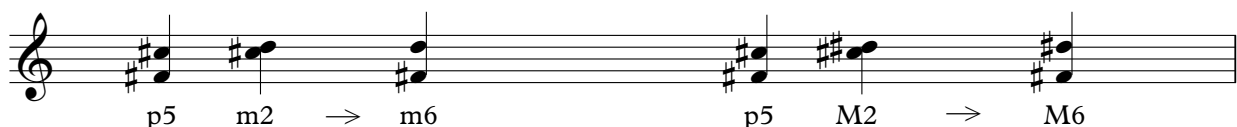
The larger an interval, the smaller its inversion. This applies to interval **quality** as well as number:

diminished	<i>inverts to</i>	augmented
minor	<i>inverts to</i>	major
perfect	<i>inverts to</i>	perfect
major	<i>inverts to</i>	minor
augmented	<i>inverts to</i>	diminished

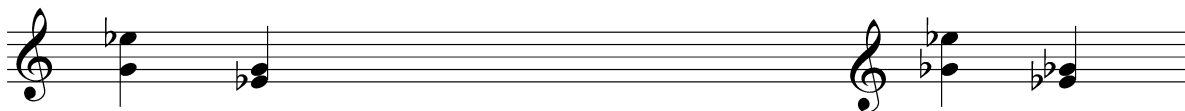
Sixths

Sixths come in major and minor qualities (they can also be augmented or—very rarely—diminished). A **minor sixth** spans 8 half steps; a **major sixth** spans 9. This is fine for definitions, **but when dealing with larger intervals, counting steps or half steps** is slow and unwieldy. Don't do it! Instead, try the methods below.

Method 1: Build on perfect fifths. A minor 6th is a perfect 5th plus a minor second; a major 6th is a perfect 5th plus a major second. You should be able to construct or ID perfect 5^{ths} with ease (see the previous handout), making this method quick and reliable.



Method 2: Invert thirds. Since major intervals always invert to minor intervals, you can reckon the quality of sixths from their inversion. If you have attained confidence and fluency with thirds, this will be quick and easy.

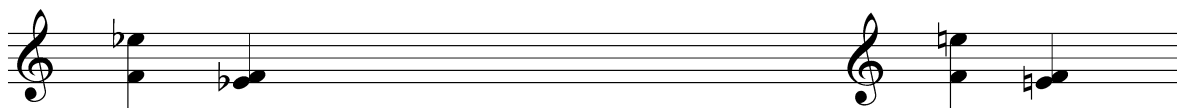


This sixth inverts to a **major** third,
so the sixth is **minor**

This sixth inverts to a **minor** third,
so the sixth is **major**

Sevenths

A **minor seventh** spans 10 half steps, a **major seventh** spans 11. You can take advantage of the inversion principle, using seconds:

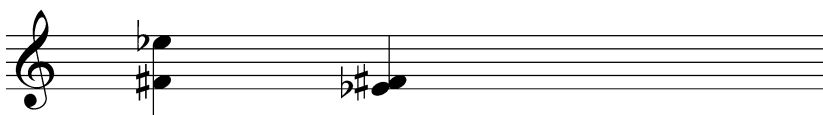


This seventh inverts to a **major** second,
so the seventh is **minor**

This seventh inverts to a **minor** second,
so the seventh is **major**

Sevenths

You also need to be comfortable with **diminished** sevenths, which (unlike the diminished form of most intervals) are relatively common. Diminished sevenths span 9 half steps and invert to **augmented** seconds, familiar from the harmonic minor scale.



This seventh inverts to an **augmented** second, so the seventh is **diminished**

Note how harmonic (vertical) seconds are notated. To avoid overlap and keep the notation clear, one of the two noteheads must be shifted horizontally. The **lower** of the two notes always goes to the **left**, regardless of whether the stem is up or down.



Notice that on stem-up seconds, it is the upper note that is on the “wrong” side of the stem, while on stem-down seconds it is the lower note that is on the “wrong” side.

Accidentals likewise shift horizontally to avoid overlapping when they are close vertically. This happens with thirds, fourths, fifths, and possibly sixths, not just with seconds. (See, for example, the G♭-E♭ sixth at the top of this page.) The general principle is that **no notation symbol overlaps with any other symbol** (except for staff lines).

What not to do

Almost all textbooks and theory websites recommend thinking of interval qualities in reference to a major scale built on the lower note, based on this circumstance:

*The interval from the tonic of a major scale up to any other degree in the major scale is either:
the **major** form of that interval (for $\hat{2}$, $\hat{6}$, and $\hat{7}$)
or the **perfect** form (for $\hat{4}$ and $\hat{5}$).*



This factoid may be useful as a **memory aid** for the size of various interval qualities:

major second:	whole step, i.e 2 half steps
major third:	2 whole steps, i.e. 4 half steps
perfect fourth:	WWH = 5 half steps
perfect fifth:	WWHW = 7 half steps
major sixth:	WWHWW = 9 half steps
major seventh:	WWHWWW = 11 half steps

But there are **multiple problems** with using the major scale as your basic measuring stick for identifying or constructing interval qualities.

Suppose you are trying to find a minor sixth above the note G#. There is there is no scale of G# major to use as a reference point. Of course, you could figure out a method to get around this, such as thinking of G major instead, and then remembering to raise the target note a half step. But this adds complexity. The same goes for A#, D#, E#, B#, and Fb, as well as any double-sharp or double-flat note.

Even for notes that can be the tonic of a major scale, this method calls for you to think of a key signature that likely has nothing to do with the actual musical context. For instance, if you're reading a piece in the key of G major and want to determine an interval which begins on scale degree 7 (F#), using the major-scale method you would need to call up the key signature of F# (6 sharps) in your mind, which is a confusing and irrelevant distraction from the music at hand.

The major-scale approach also flops as soon as you are asked to find the pitch that lies a certain interval **below** a given note. Again, you could figure out ways to deal with this situation. For example, one way is to remember that the intervals from the tonic **down** to any degree of the major scale form the **minor** or perfect form of the interval in question. But now the "simple" major-scale rule is not quite so simple. And in fact, most students have a harder time dealing with descending intervals for just this reason.

Last but not least, the association of interval quality with the major scale also accounts for the mislabeling of perfect fourths and fifths as "major", a common mistake among theory beginners.

Don't fall into this trap! Use the methods outlined in the previous pages instead.