RAGE

Violoncello & Piano

JORDAN ALEXANDER KEY

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“RAGE”

FOR

CELLO & PIANO

2021

Explanation of System of Pan-Rational Rhythmic Notation:

This work uses what I call "pan-rational time signatures" (known elsewhere and erroneously as "irrational time signatures"). I do not call them "irrational" since they are in no way "irrational" (either psychologically or mathematically). They are "rational" proportions, but do not use powers of 2 for the bottom number (not written over 2, 4, 8, 16, 32, 64, etc.). Such a system of time signature grew out of questions like "why isn't there a 'fifth' or 'third' note?" Well, many music teachers will simply say, "because there isn't one," but of course there is.

What we call a triplet is actually just some multiple or divisions of a "third note," and similarly the quintuplet some "fifth note." Systems of subdividing fundamental note values (like the breve or whole-note) into groups other than "dyadic-rationals" (note subdivisions in the form $\frac{1}{2^n}$) into "pan-rationals" (third, fifth, seventh as compared to half, fourth, eighth, sixteenth, etc.) have existed at prior points in music history (particularly the late Middle Ages and Renaissance), using uncommon and arcane systems of mensuration. Such systems have long fallen out of favor; however, if reincorporated into our system of musical language, they can allow for the fluid notations of some rather complex rhythmic ideas without the use of excessive tempo changes or tuplet (and embedded tuplet) markings.

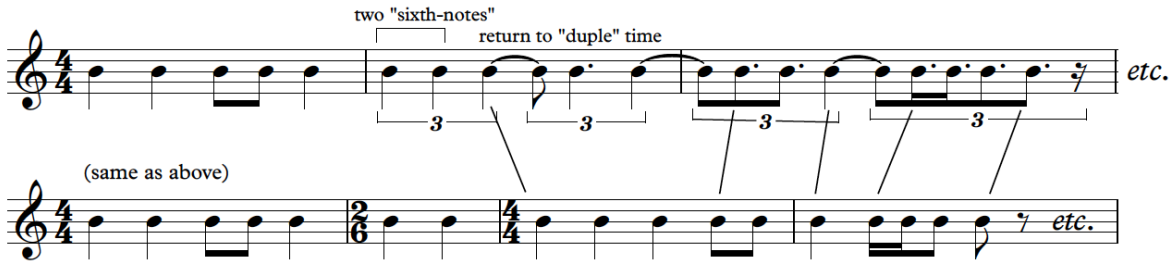
This work employs my system of pan-rational rhythmic notation to execute a rhythmic hierarchy with not only dyadic note subdivisions, but also notes that are triadic and pentadic (note subdivisions in the form of $\frac{1}{3^n}$ and $\frac{1}{5^n}$, e.g. 3rd-notes, 5th-notes and their subdivisions and combinations with each other. Thus, this piece employs a whole-note value that is simultaneously dyadically (2), triadically (3), pentadically (5), hexadically (2*3), and pentadectadically (3*5) divisible.

The system of pan-rational rhythmic notation ("pan-rationalism") is the culmination of my dissertation, which surveyed past and present systems of exceptional rhythmic notation in an effort to understand how systems of "non-dyadic" rhythmic notation came into being and why/how they disappeared from use in order that I could fashion a better, more comprehensive system that would allow for the notation of any subdivision or combination of note values apart from tuplets and the requirements of their aggregation. By this, I mean that pan-rational notation no longer requires exceptional rhythmic values be confined to tuplets, which themselves require their own completion and grouping. This grouping disallows easy intermingling of dyadic and non-dyadic rhythmic values and the presentation of non-dyadic rhythmic values without their compete set of related subdivisions (i.e. pan-rationalism permits the presentation of fractional parts of a tuplet).

For example, imagine if I wanted to write a quarter note triplet in a 4/4 time signature, but I only wanted two-thirds of that triplet (namely, two quarter notes of the three within the quarter-note triplet), and then I wanted to return directly to duple time with no hint of the prior triplet. What would I do? Well, I would have to write the two notes of the triplet, but then, in returning to the simple duple time from the 4/4, I would have to endlessly tie over values from within triplets.

However, if I just recognize that I can create “sixth notes,” then I can specify that I want two “sixth-notes” without the use of triplet and many ties subsequently. This can be done using a “pan-rational” time signature, namely 2/6. See Figure 1.

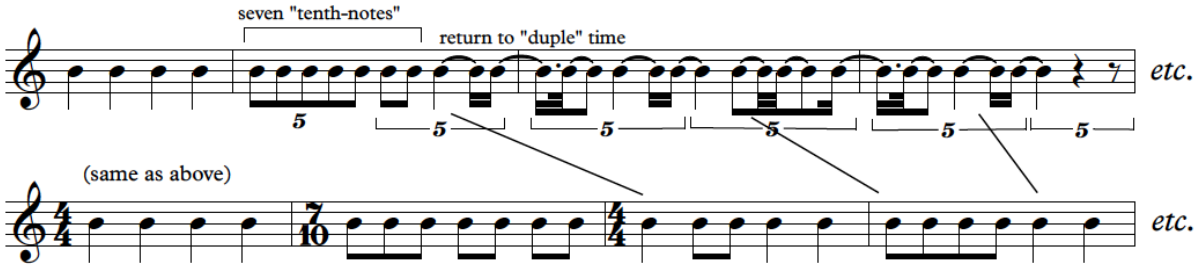
Figure 1:



Why “2/6” and “sixth-notes” rather than “third-notes”? Well, if we consider the “whole-note” as the fundamental value of rhythm (perhaps appropriately since it is “whole”), then to get the quarter-note triplets, we must recognize that the whole-note must be divided equally into six parts. Then, to get only two of these six equal divisions of the whole note, we simply specify “2,” just as one might specify “3” in 4 equal divisions of the whole to get 3/4 rather than 4/4.

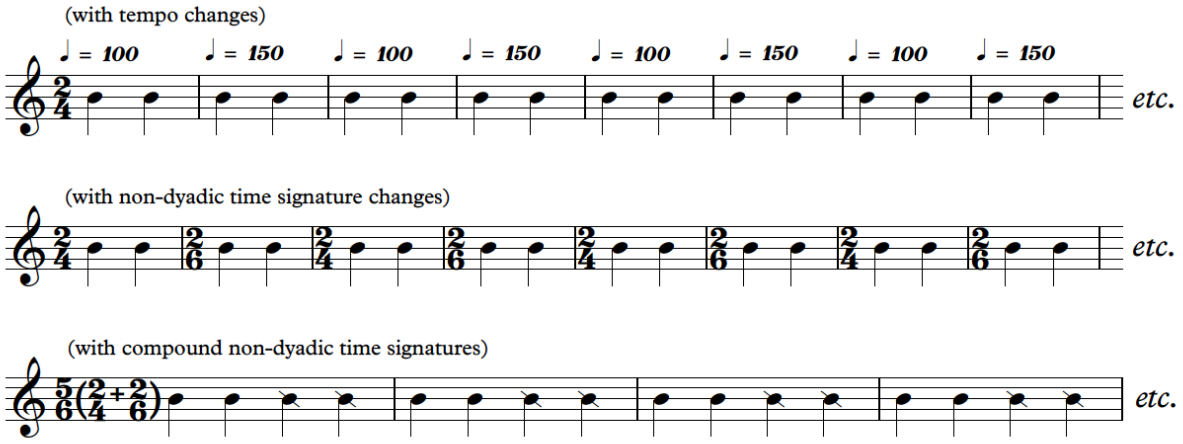
Similarly, if we want seven units of five equal divisions of the whole note (1 and 2/5’s of an eighth-note quintuplet), we will recognize that we must divide the whole into 10 equal parts and play seven of those parts, thus requiring a 7/10 time signature and “tenth-notes.” See Figure 2.

Figure 2:



Such a system allows for the rapid alternation between different tempos without the use of tempo markings on each measure. Furthermore, it utilizes and recognizes those rhythmic fluctuations that are proportional to each other. The notational possibilities of non-dyadic time signatures as compared to tempo changes are demonstrated, in a rudimentary form, in Figure 3.

Figure 3:



Naturally, there are limits to the performability of such diverse rhythmic structures; consequently, the number of available non-dyadic rhythmic values is limited to a relatively small subset of low primes (2, 3, 5, 7, 11, 13, and maybe 17 and 19). Beyond such unique subdivisions, performability becomes exceedingly difficult and the difference between closely values rhythmic subdivisions becomes difficult to accurately perform and perceive. Thus, as the potential of performer of this piece, do not initially worry that the rhythmic subdivision contained herein might be unperformable; they are well within the capabilities of human performance and perception!

However, the challenge of this work (beyond the typically technical issues) is that this piece presents rhythmic structures that are unique to music at present (i.e. concatenations of various combinations of dyadic and tridectadic note values without their respective aggregates). However, I imagine the prospect of a wholly unique rhythmic world yet to be explored might be well-worth the new cognitive challenge.

To notate this music, I have made two general additions to our present system of rhythmic notation: first, the interpretation of time signature; second, the meaning of note shapes.

In regards to time signature, you will find the time signatures in this work are in the form of $\frac{k}{15n}$ or $\frac{k}{6n}$, where the lower number designates the unique subdivisions available within the rhythmic hierarchy according to the available unique prime factors of the number given (3 and 5 in the case of 15 and 2 and 3 in the case of 6) and k represents the number of those equal subdivisions of the whole note appearing in each measure (e.g. 15/15 means that the whole note may be divided into either 15 equal parts or any combination or subdivision of the prime factors of 15. The charts below give the notation of these values along with all theoretical further subdivisions. Those notes highlighted in green are those used in this piece.

To differentiate q-notes (3^{rd} or 5^{th}-notes depending on the pan-rational hierarchy in use in any moment) from p-notes (2^{nd} or 3^{rd}-notes depending on the pan-rational hierarchy in use in any moment) a slash (backward and forwards respectively) have been placed over the note heads. The tempo value of these notes, if one desires it can be calculated by taking the tempo of the whole note (18 bpm in this piece) and multiplying it by the value of the note (e.g., the tempo for 15^{th}-note is 18*15 = 270 bpm or as close as one can reasonably get).

I suggest beginning studying the piece by practicing 15 equal subdivisions of a whole-note at 18 bpm. Then, once that rhythmic scheme is well established in one's mind and hands, then begin to alternate between measures of 3, 9, 5, 15, 2, and 4 equal subdivisions. Once this is well established, begin subtracting 15^{th}-notes from the measure of 15 equal subdivisions, progressing all the way to one 15^{th}-note per measure alternating with measures of 4/4 and/or 3/3 (or 9/9).

For further clarification of this system of rhythmic notation, see this summary video: https://www.youtube.com/watch?v=fN4fU4laue4

If the performer has any questions or needs any clarification on this system of pan-rational rhythmic notation, please do not hesitate the contact the composer (contact information is given below) or refer to his thesis, wherein this system is comprehensively given.

Composer Contact:

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Dissertation Title: "Pan-Rational & Irrational Rhythm, The History, Development, and Modern Implementation of Nondyadic Rational Rhythms in Western Music" (University of Florida, 2021)

Pentadecaplex Two-Dimensional Rhythmic Hierarchy:

Rhythmic hierarchy for signatures in the form of $\frac{k}{pq}$, where k is some integer partition of the whole-note, and p and q are the distinct prime factors of the whole, where $p = 3$ and $q = 5$ and n is any positive integer..

$\frac{k}{15(n)}$ 	q note 5th note 	q^2 note 25th-note 	q^3 note etc. 	q^4 note 
p note 3rd-note 	pq note 15th-note 	pq^2 note etc. 	pq^3 note 	pq^4 note 
p^2 note 9th-note 	p^2q note etc. 	p^2q^2 note etc. 	p^2q^3 note 	p^2q^4 note 
p^3 note 27th-note 	p^3q note 	p^3q^2 note 	p^3q^3 note 	p^3q^4 note 
p^4 note etc. 	p^4q note 	p^4q^2 note 	p^4q^3 note 	p^4q^4 note 

Hexaplex Two-Dimensional Rhythmic Hierarchy:

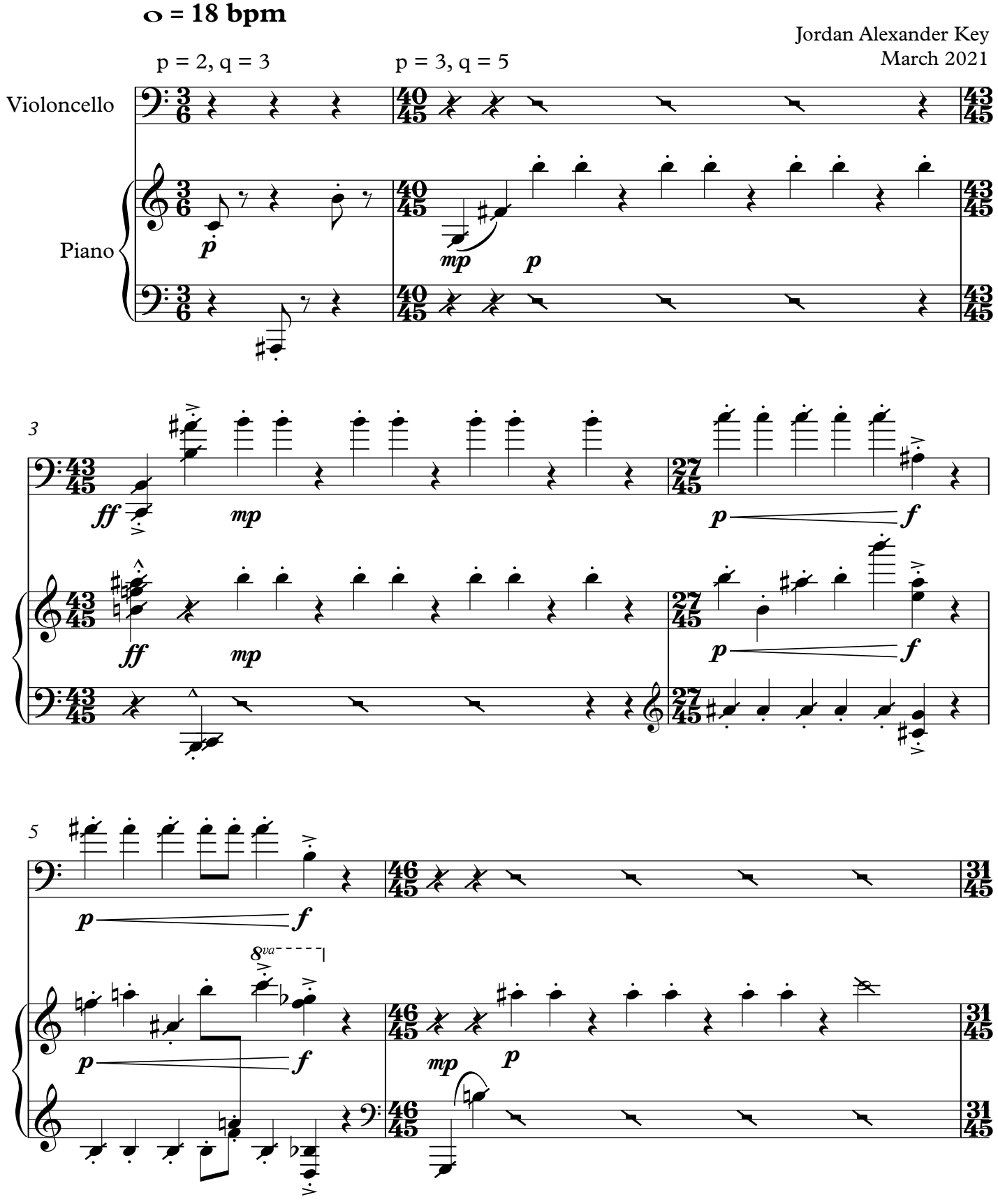
Rhythmic hierarchy for signatures in the form of $\frac{k}{pq}$, where k is some integer partition of the whole-note, and p and q are the distinct prime factors of the whole, where $p = 2$ and $q = 3$ and n is any positive integer.

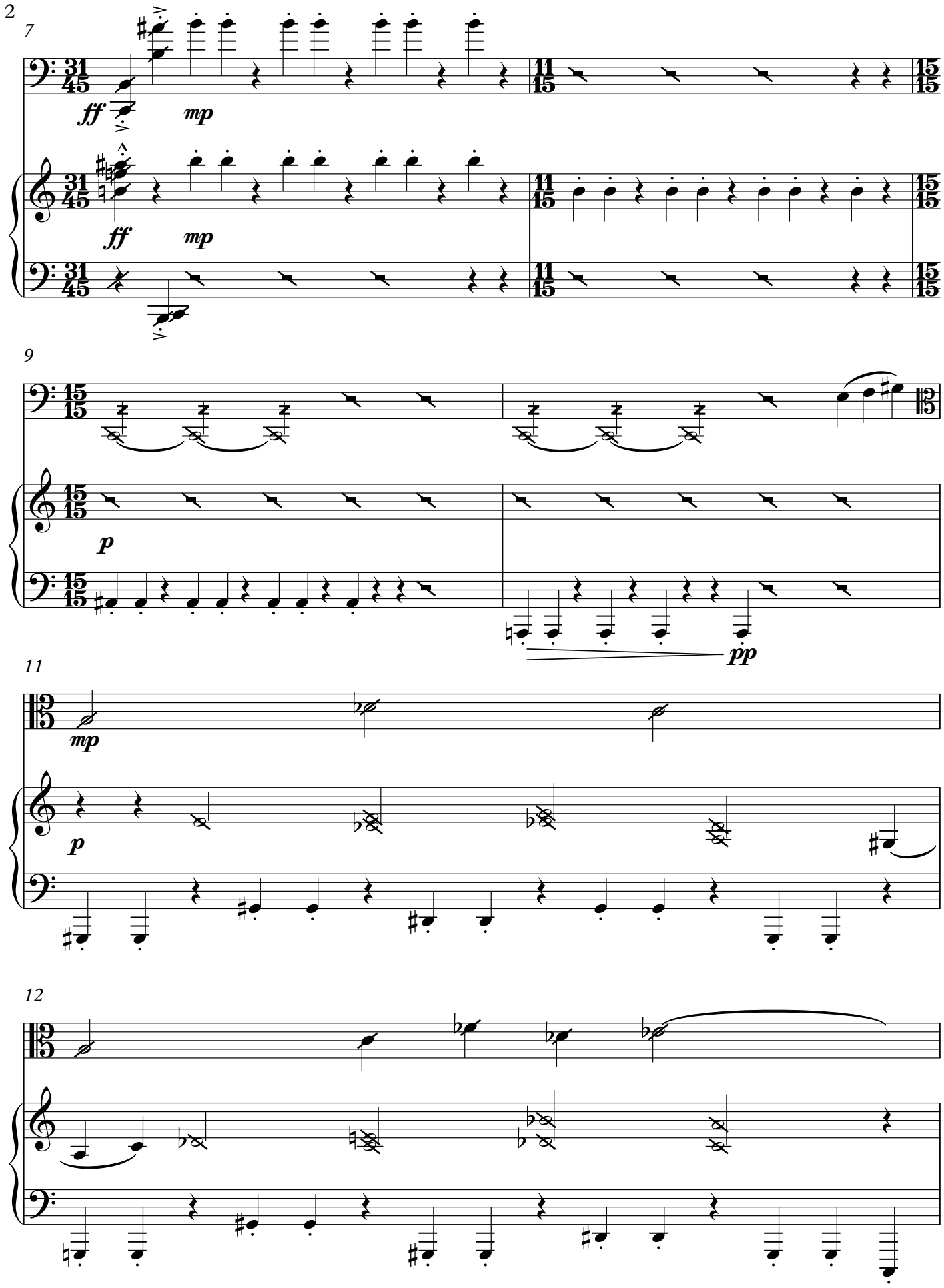
$\frac{k}{6(n)}$ 	q note 3rd-note 	q^2 note 9th-note 	q^3 note 27th-note 	q^4 note etc. 
p note 2nd-note 	pq note 6th-note 	pq^2 note 18th-note 	pq^3 note etc. 	pq^4 note etc. 
p^2 note 4th-note 	p^2q note 12th-note 	p^2q^2 note 36th-note 	p^2q^3 note etc. 	p^2q^4 note etc. 
p^3 note 8th-note 	p^3q note 24th-note 	p^3q^2 note 	p^3q^3 note 	p^3q^4 note 
p^4 note 16th-note 	p^4q note etc. 	p^4q^2 note 	p^4q^3 note 	p^4q^4 note 

Congruent Rest Values to the Above Notes:

$\frac{k}{pq(n)}$	q	q^2	q^3	q^4
				
p	pq	pq^2	pq^3	pq^4
				
p^2	p^2q	p^2q^2	p^2q^3	p^2q^4
				
p^3	p^3q	p^3q^2	p^3q^3	p^3q^4
				
p^4	p^4q	p^4q^2	p^4q^3	p^4q^4
				

Rage

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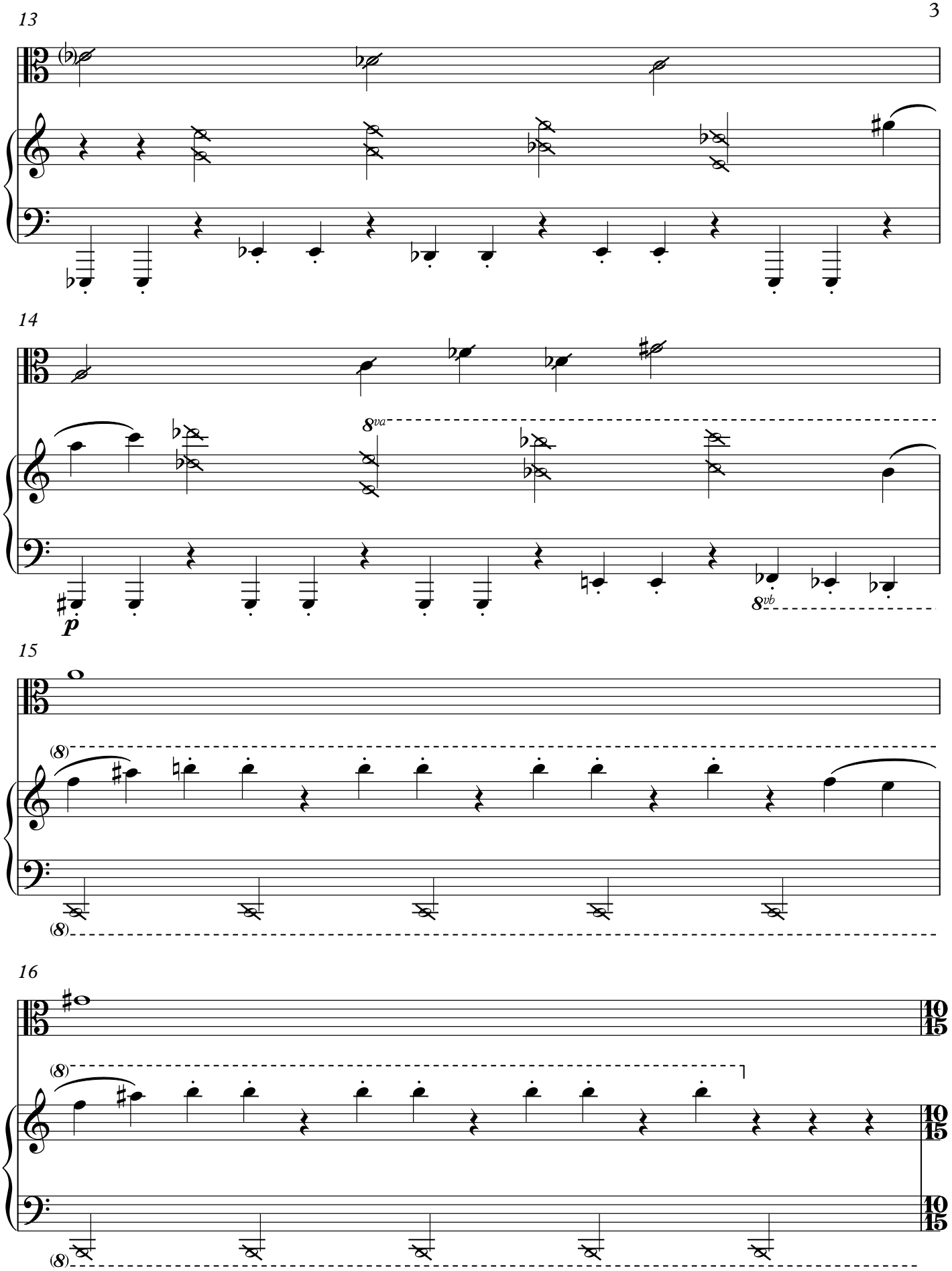
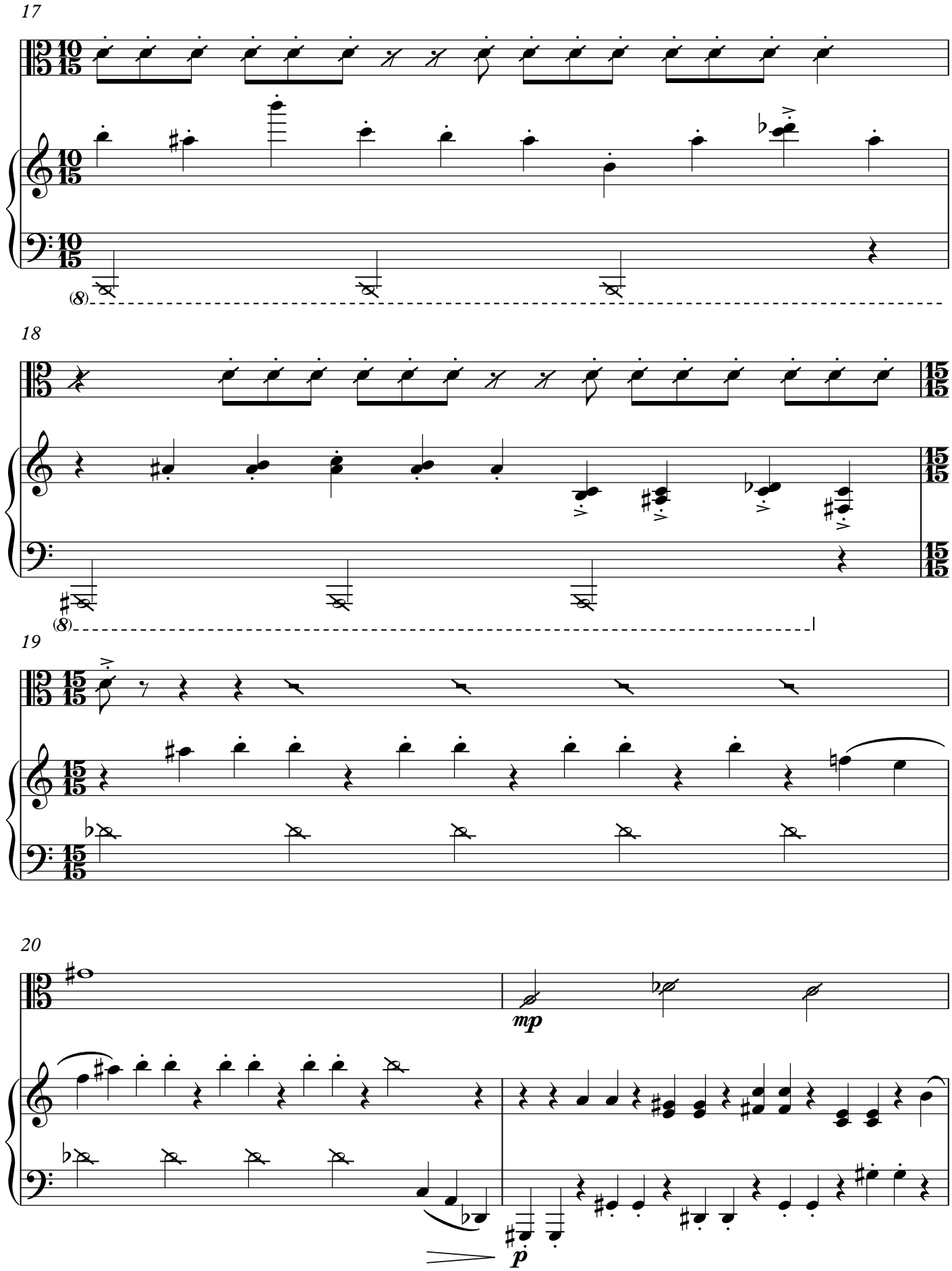
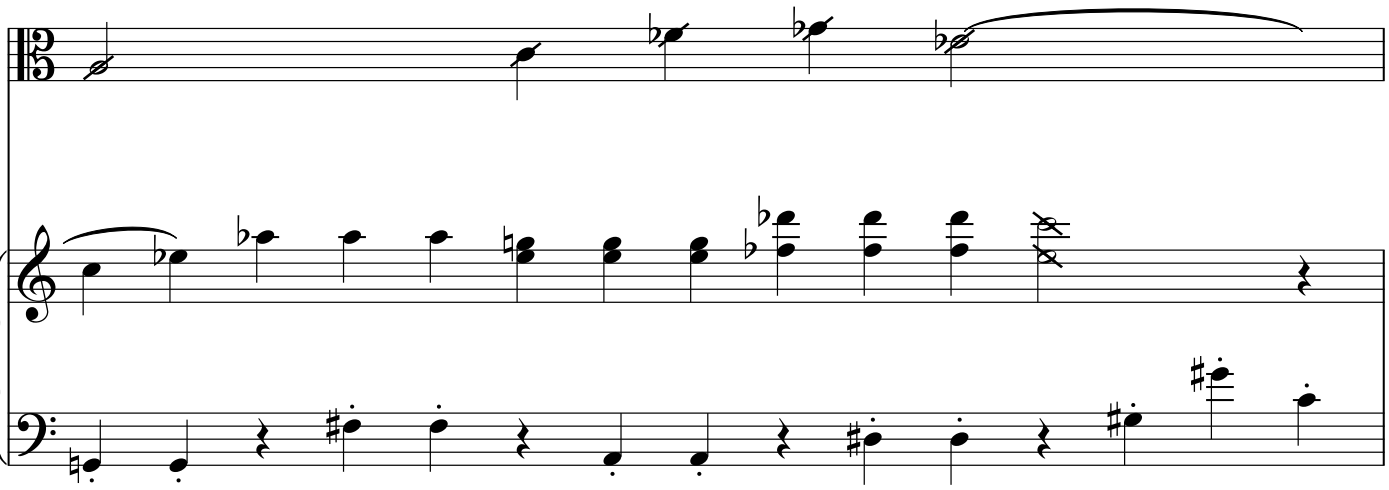
ff
mp
ff
mp
9
p
pp
11
mp
p
12


13
14
8va
p
8vb
15
(8)
(8)
16
(8)
(8)
10
15
10
15
10
15


17
18
19
20
mp
p

22



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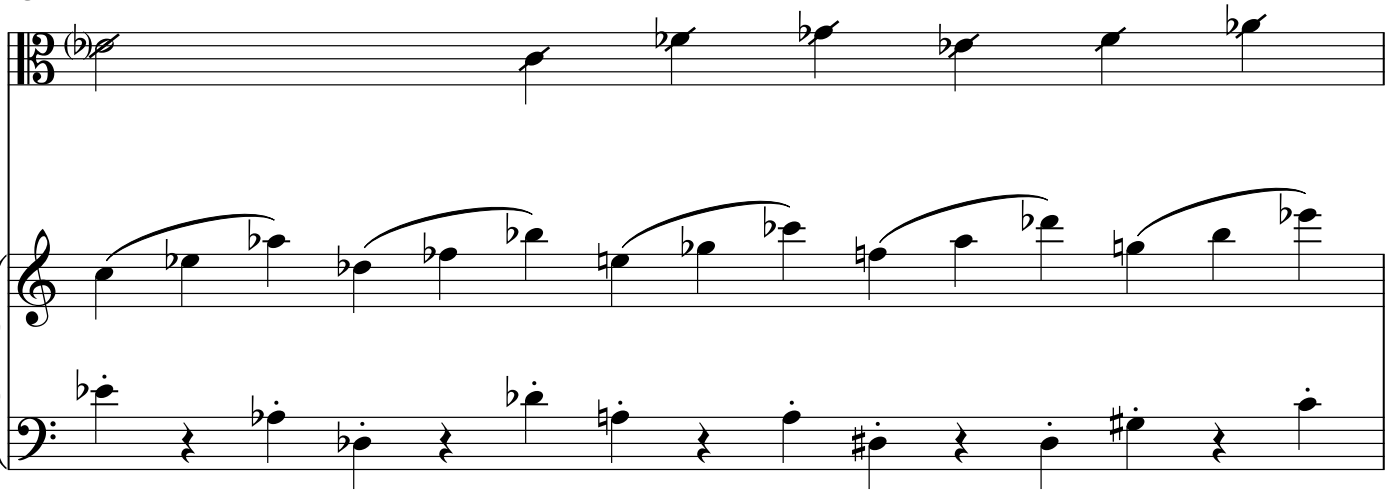

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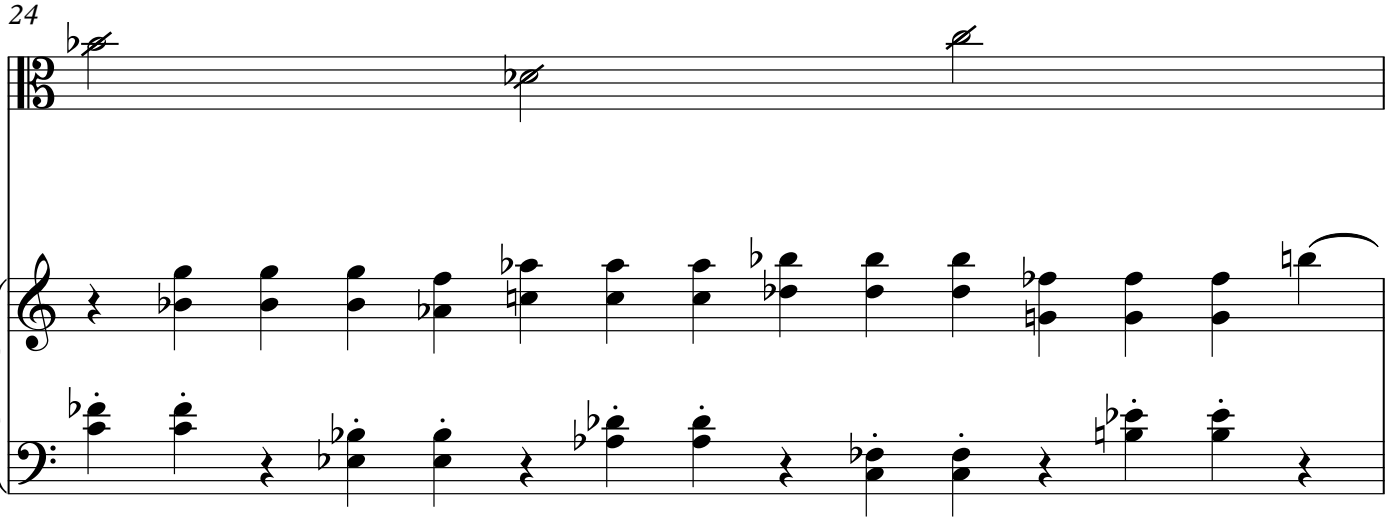
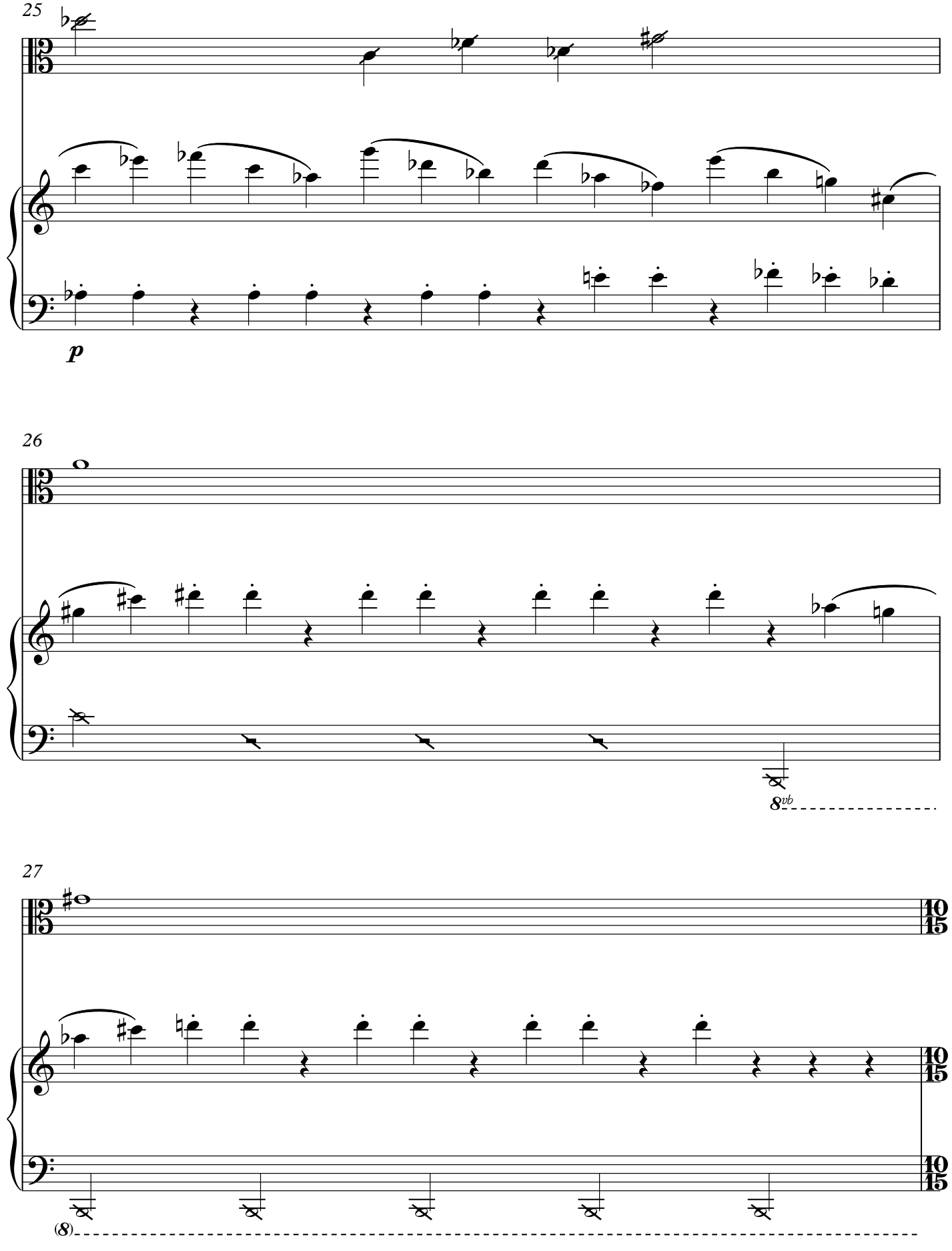
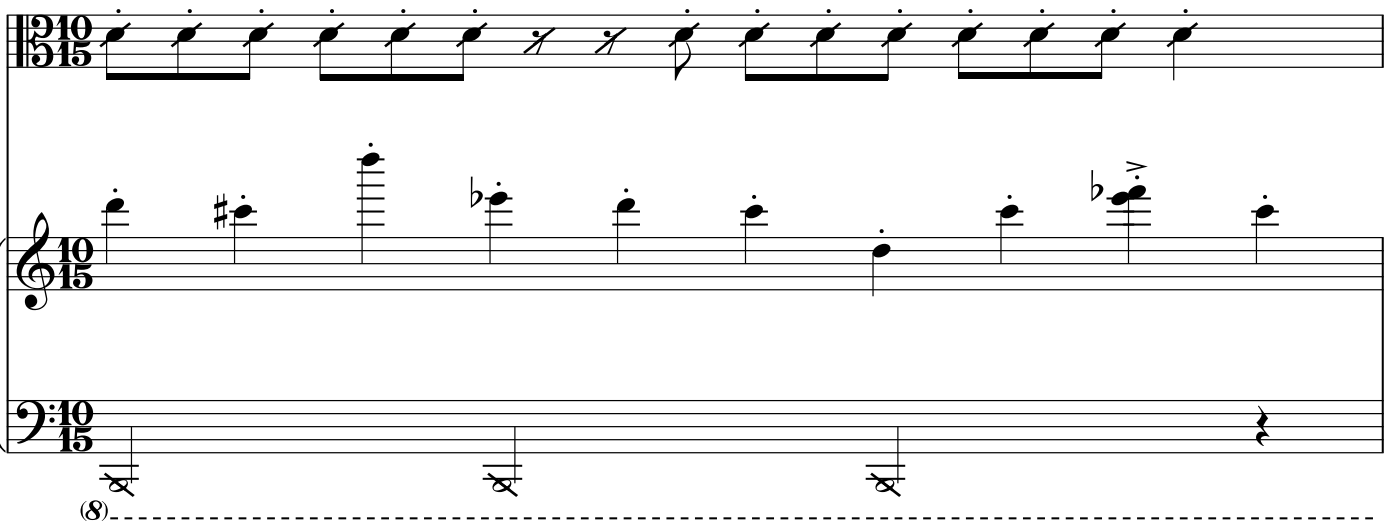



25
p
26
8vb
27
10
15
10
15
10
15
(8)

28



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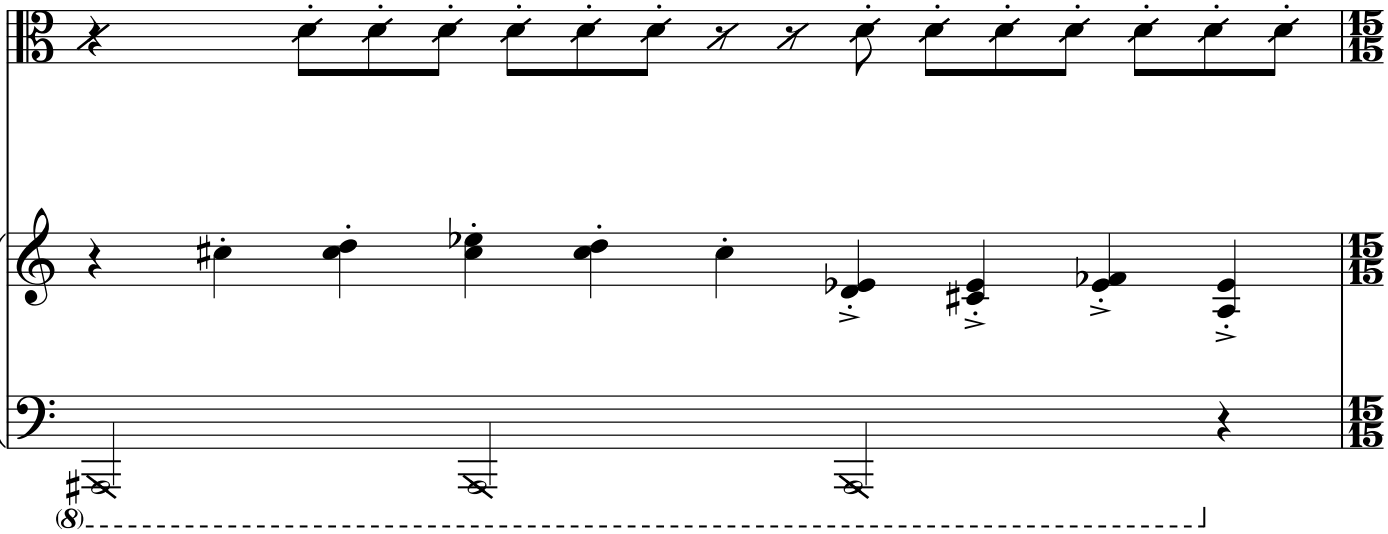

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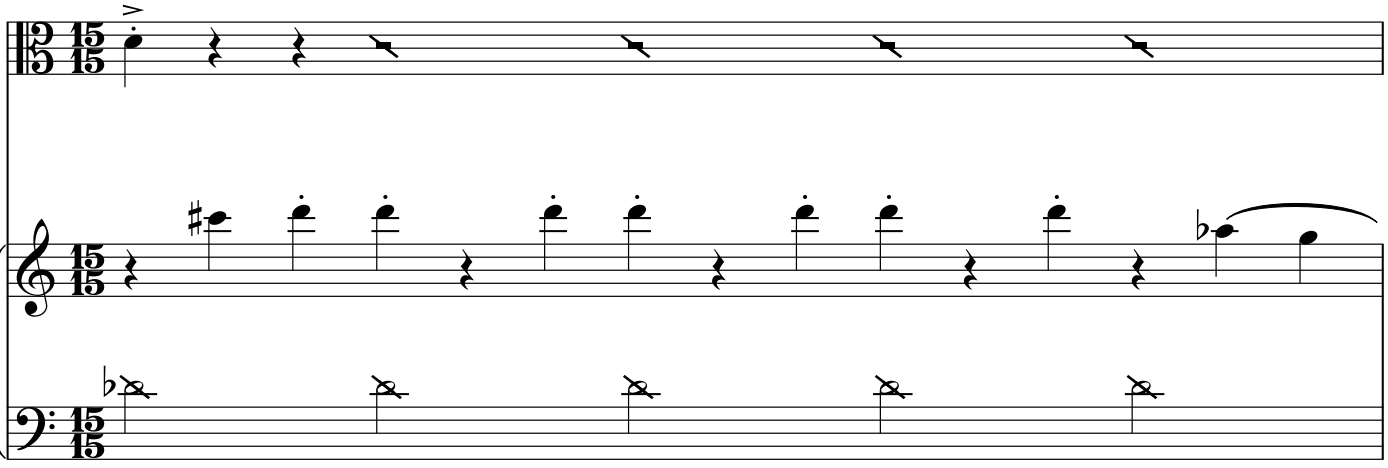

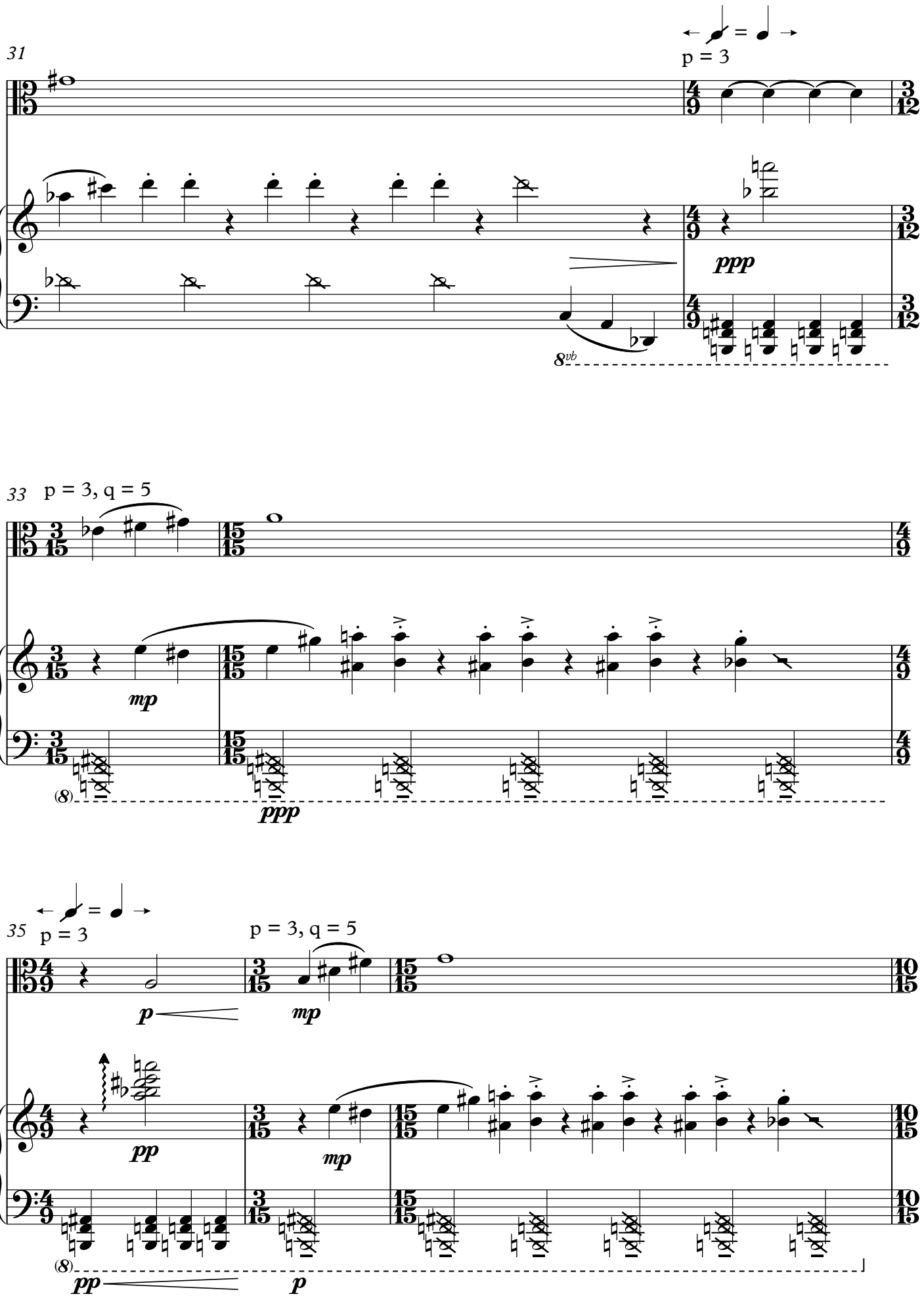
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p = 3
ppp
8vb
33
p = 3, q = 5
mp
ppp
35
p = 3
p
p = 3, q = 5
mp
pp
mp
pp
p

38

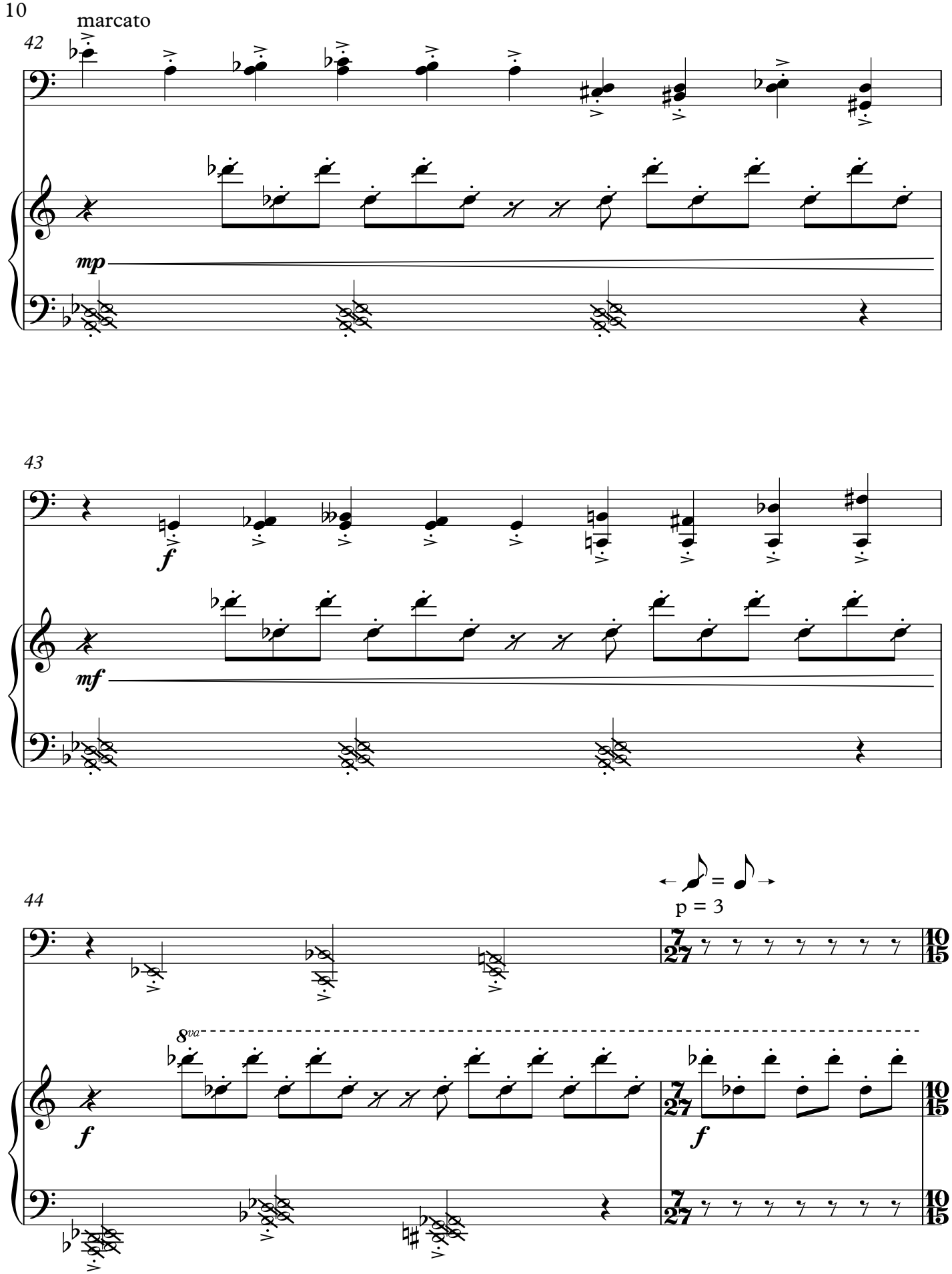
39

40

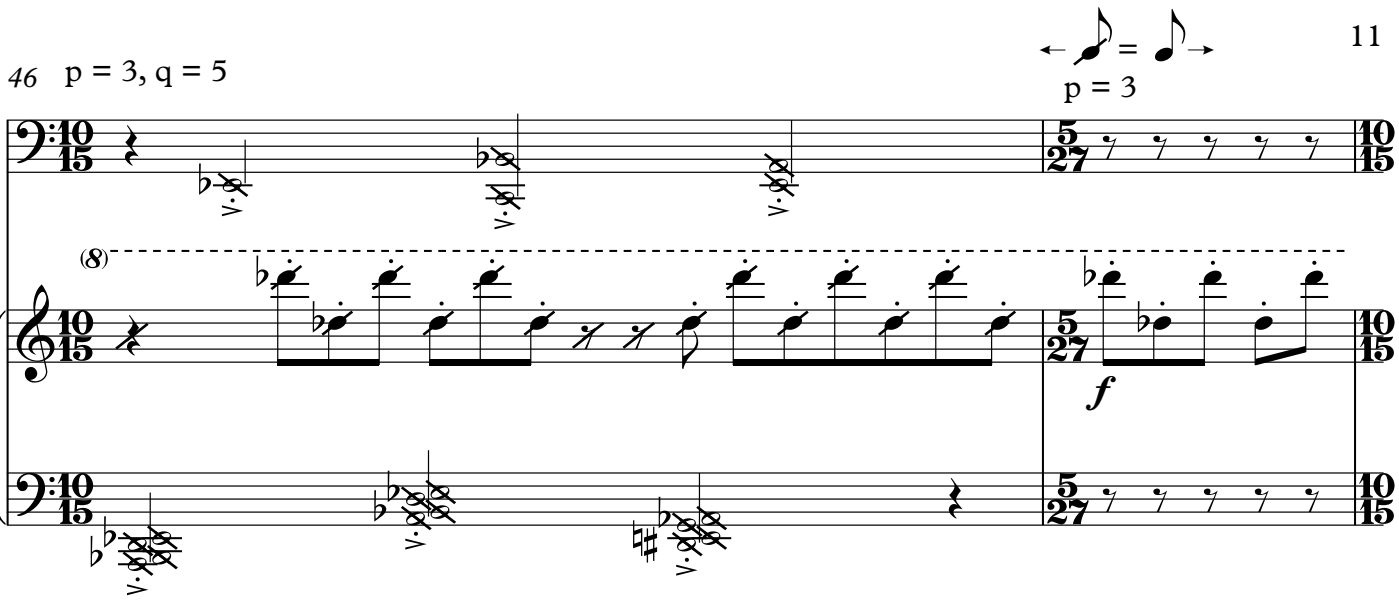
f

41

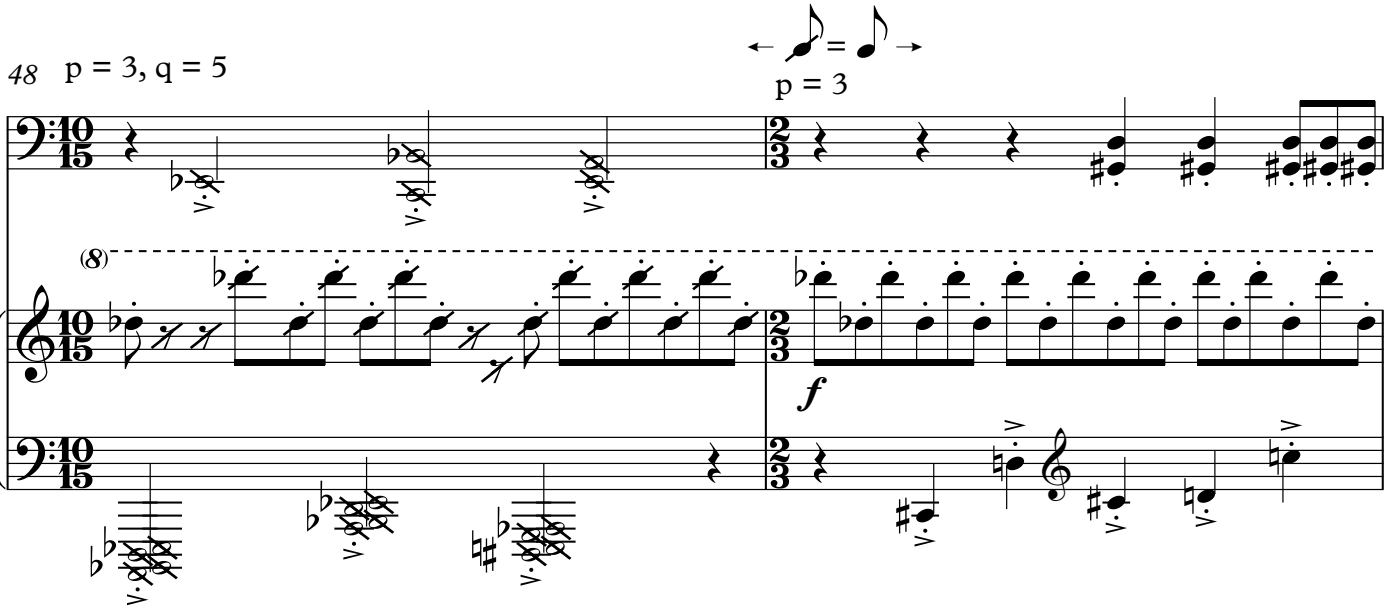
ff


marcato
42
mp
43
f
mf
44
p = 3
8va
f
f
7/27
10/15

46 p = 3, q = 5



48 p = 3, q = 5



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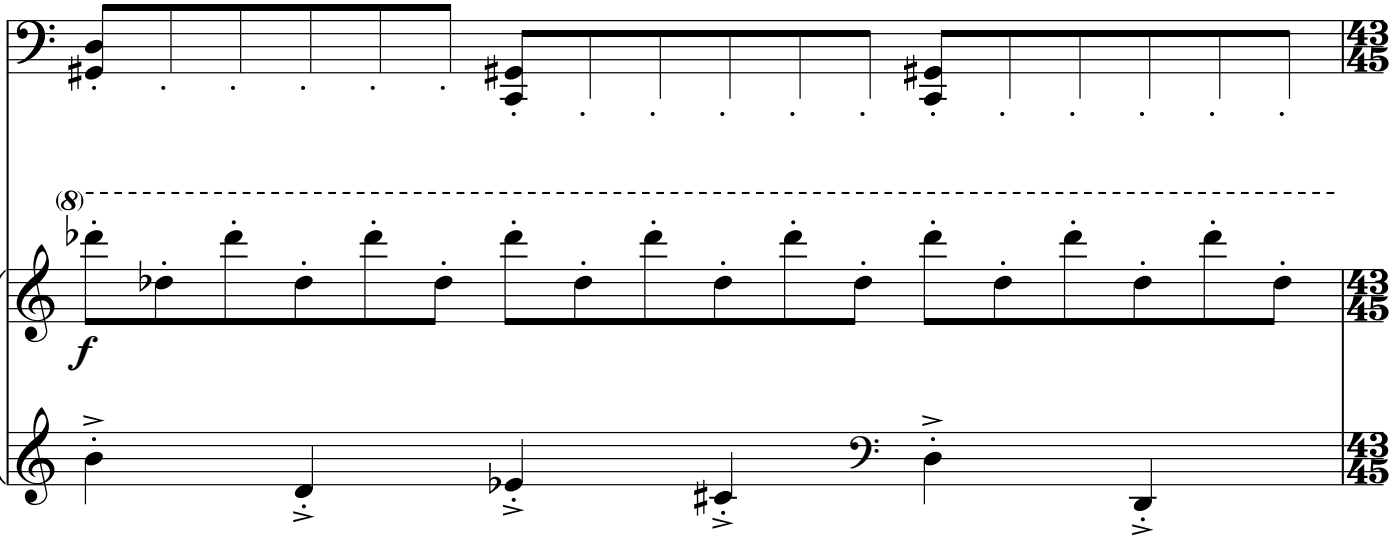

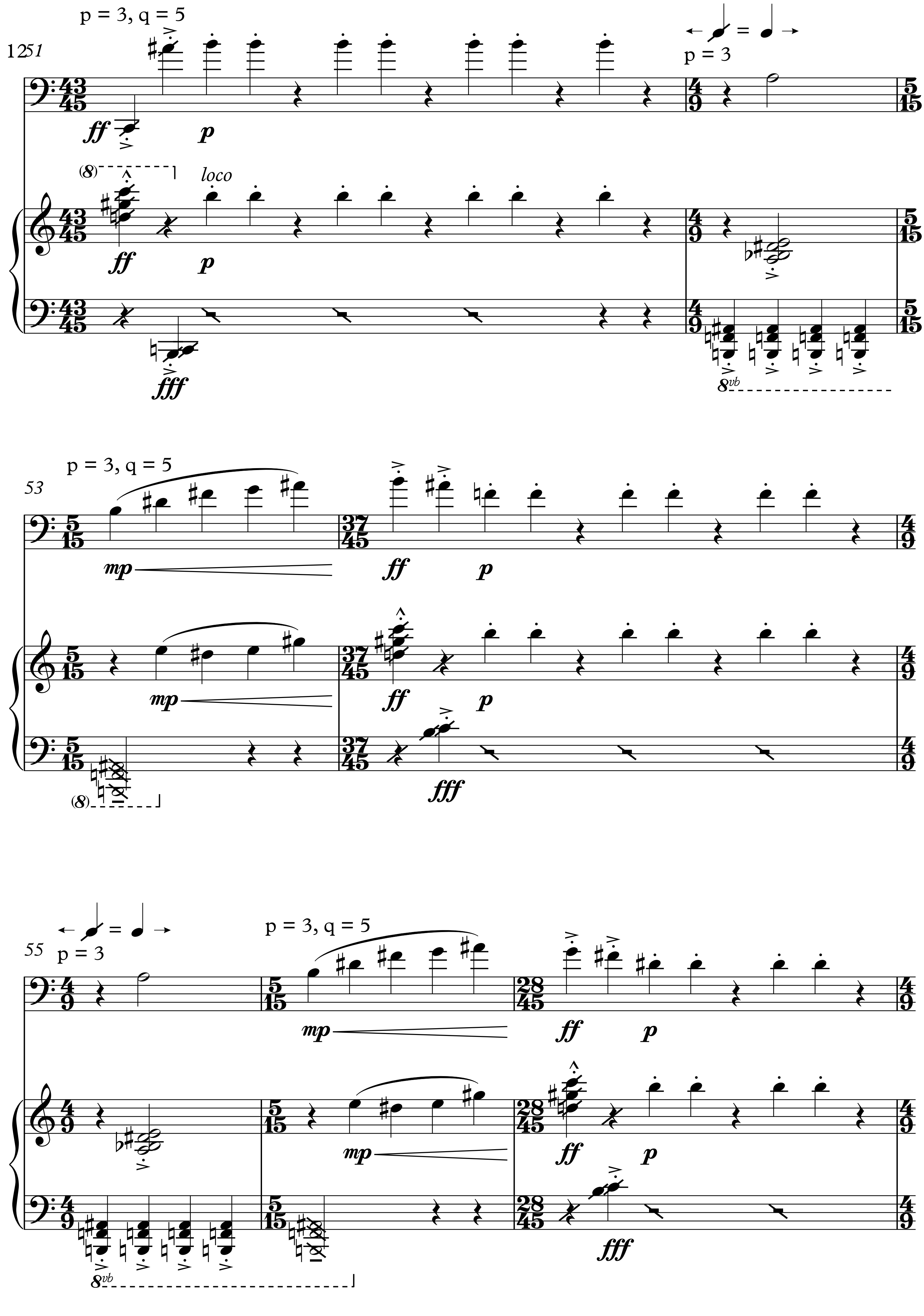
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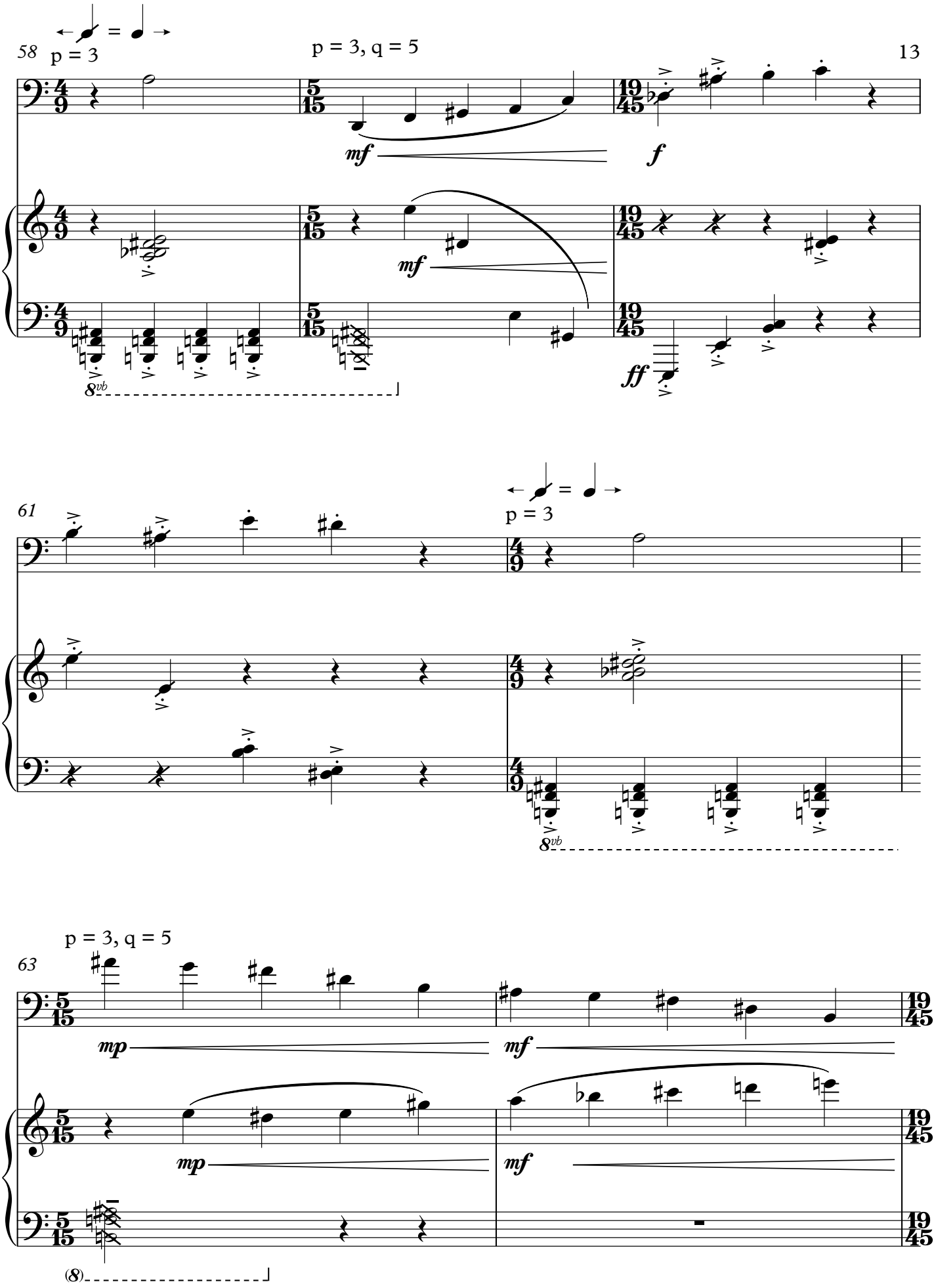
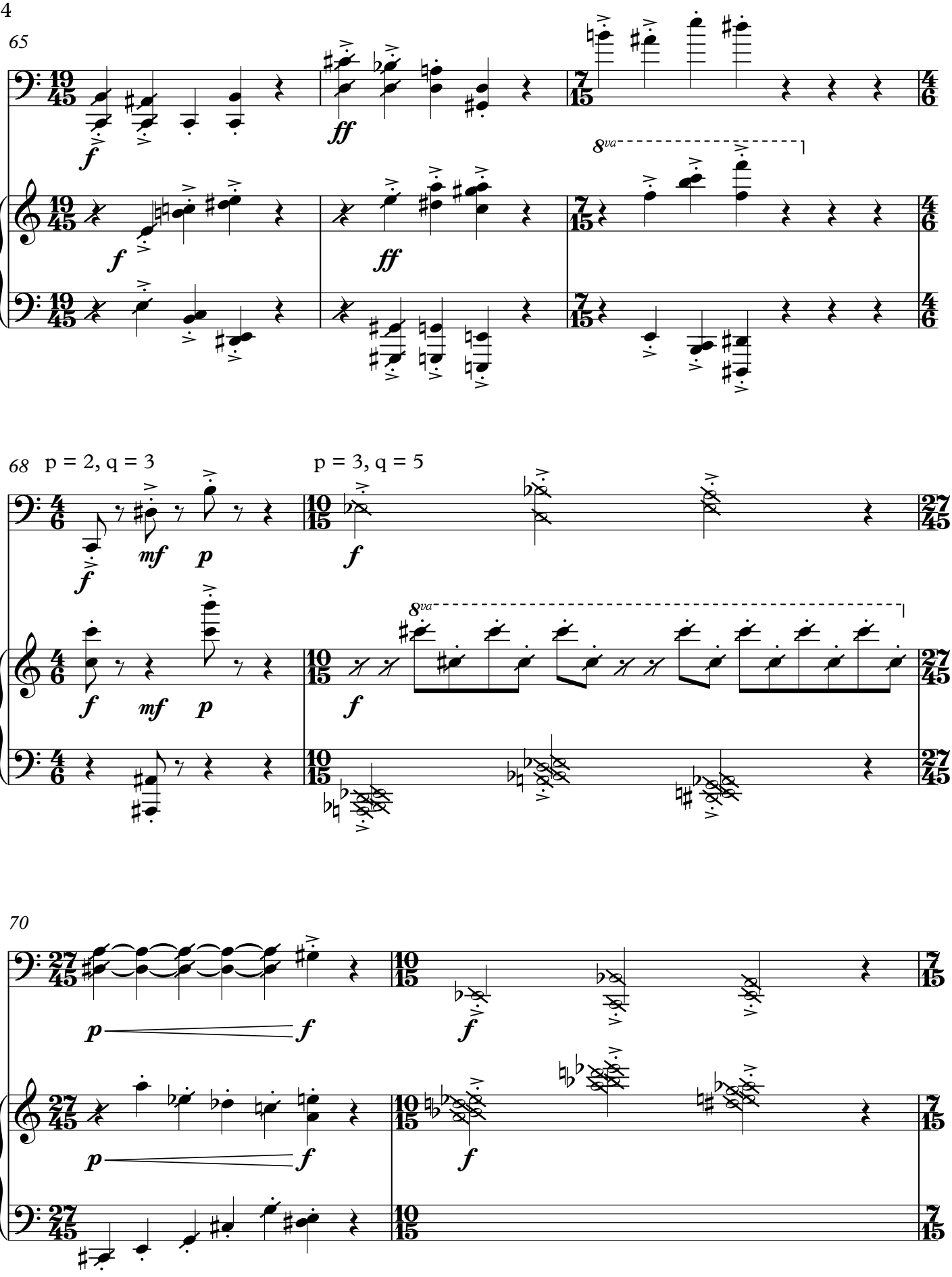
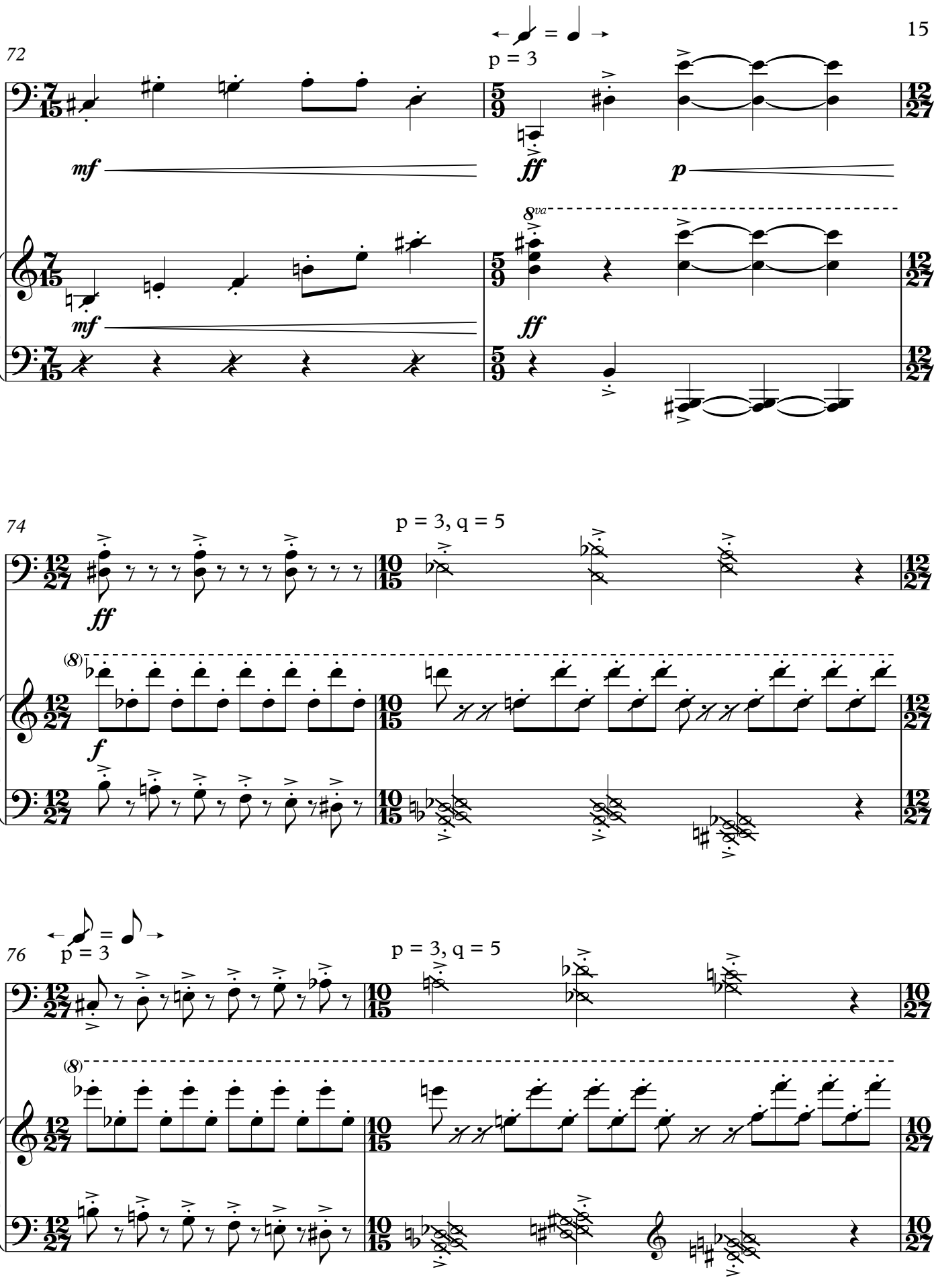
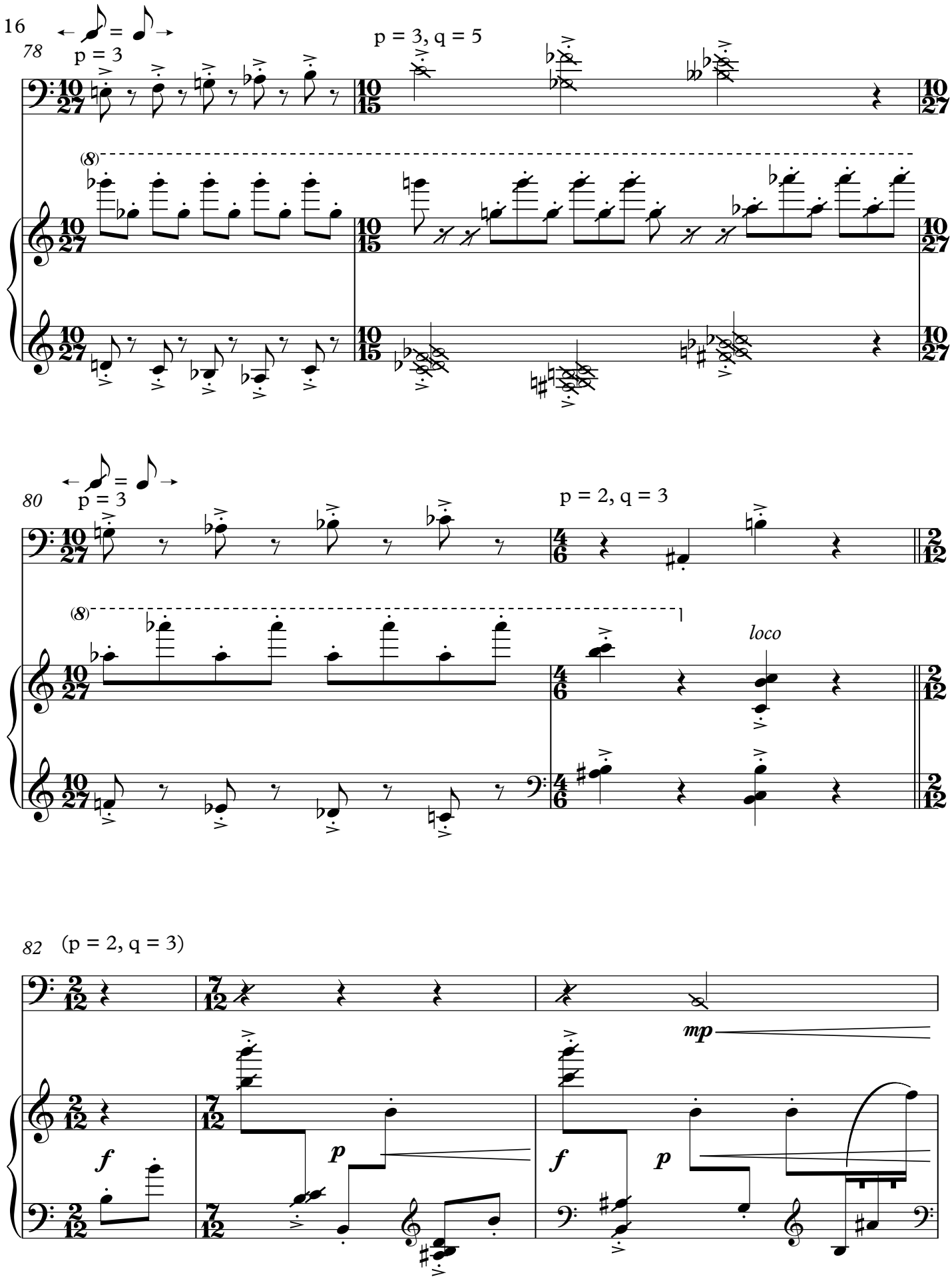
p = 3, q = 5
ff
p
(8)
loco
fff
p = 3
8vb
53
p = 3, q = 5
mp
ff
p
fff
(8)
55
p = 3
p = 3, q = 5
mp
ff
p
fff
8vb


58
p = 3
p = 3, q = 5
mf
f
mf
ff
8vb
61
p = 3
8vb
63
p = 3, q = 5
mp
mf
mp
mf
(8)


65
68
p = 2, q = 3
p = 3, q = 5
70
8va


72
p = 3
mf
ff
p
8va
mf
ff
74
p = 3, q = 5
ff
(8)
f
76
p = 3
p = 3, q = 5
(8)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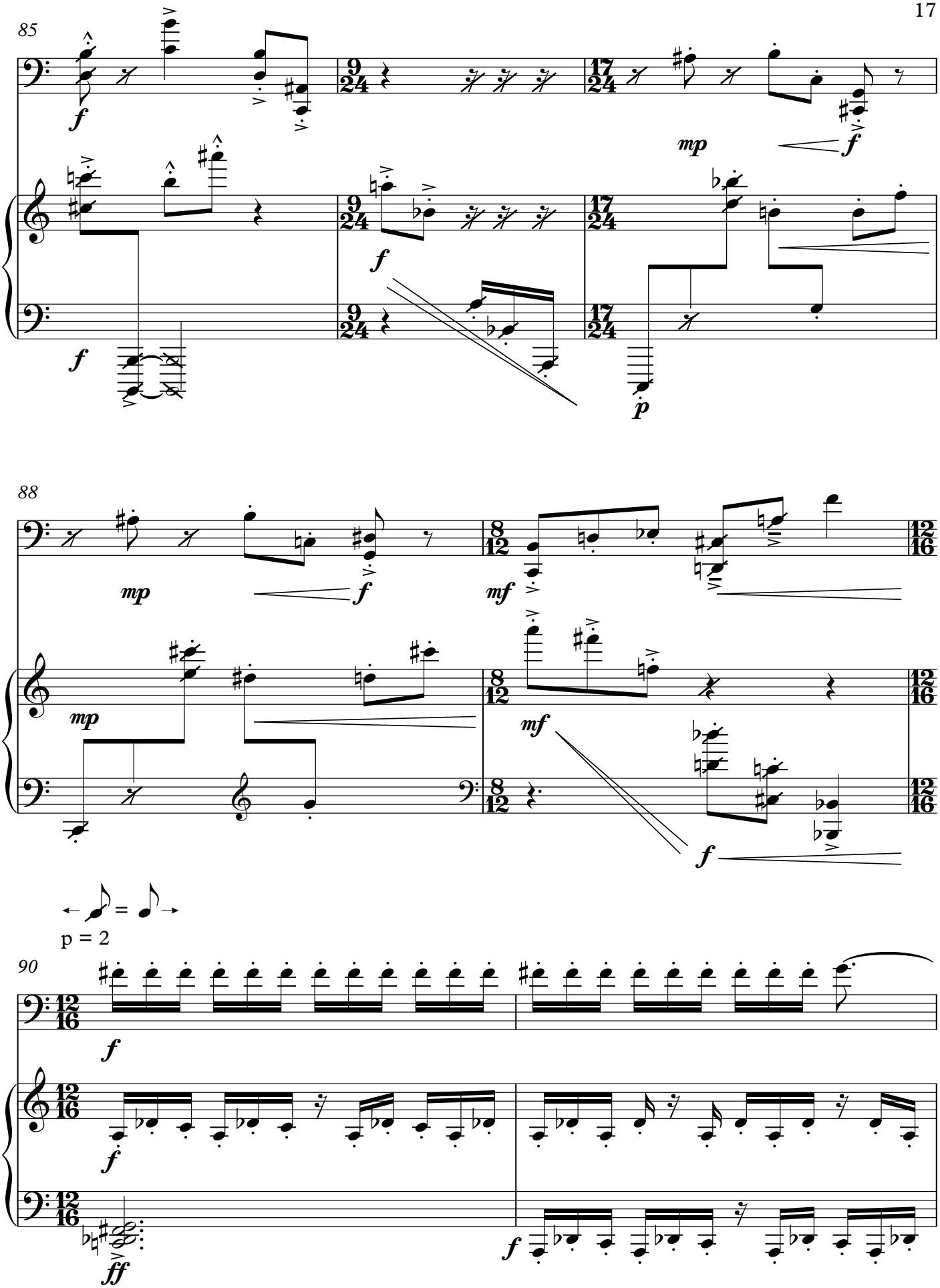
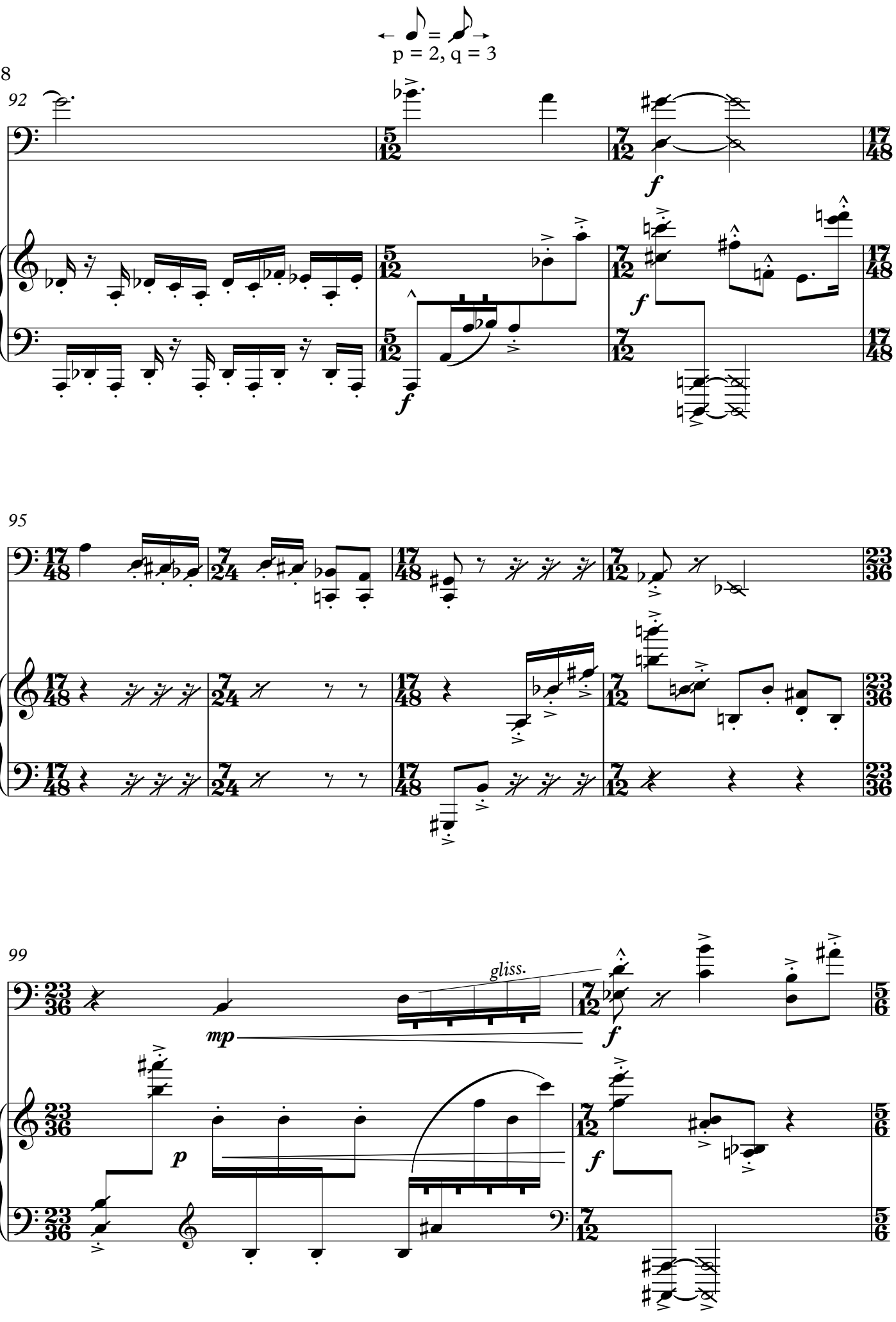
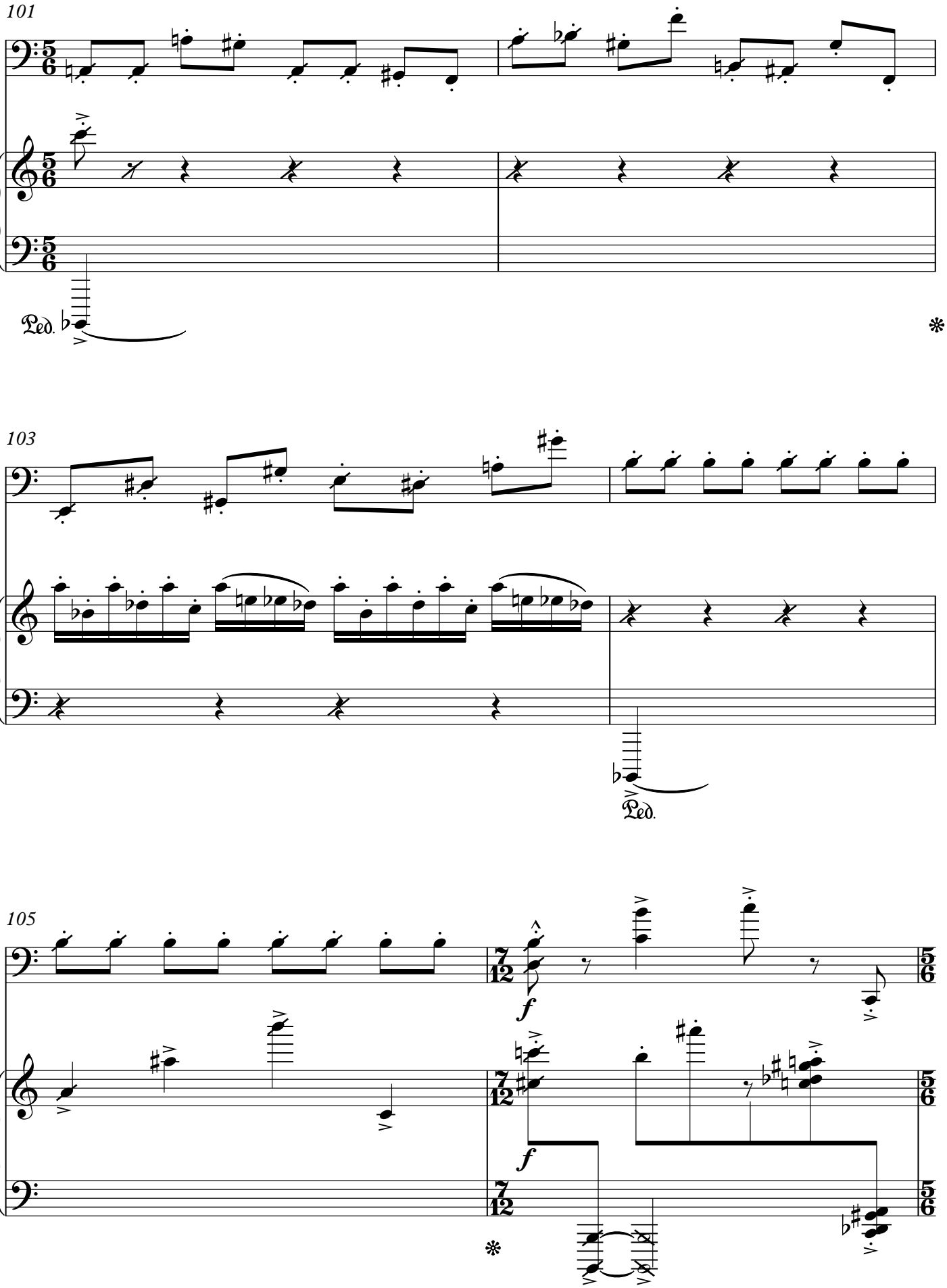
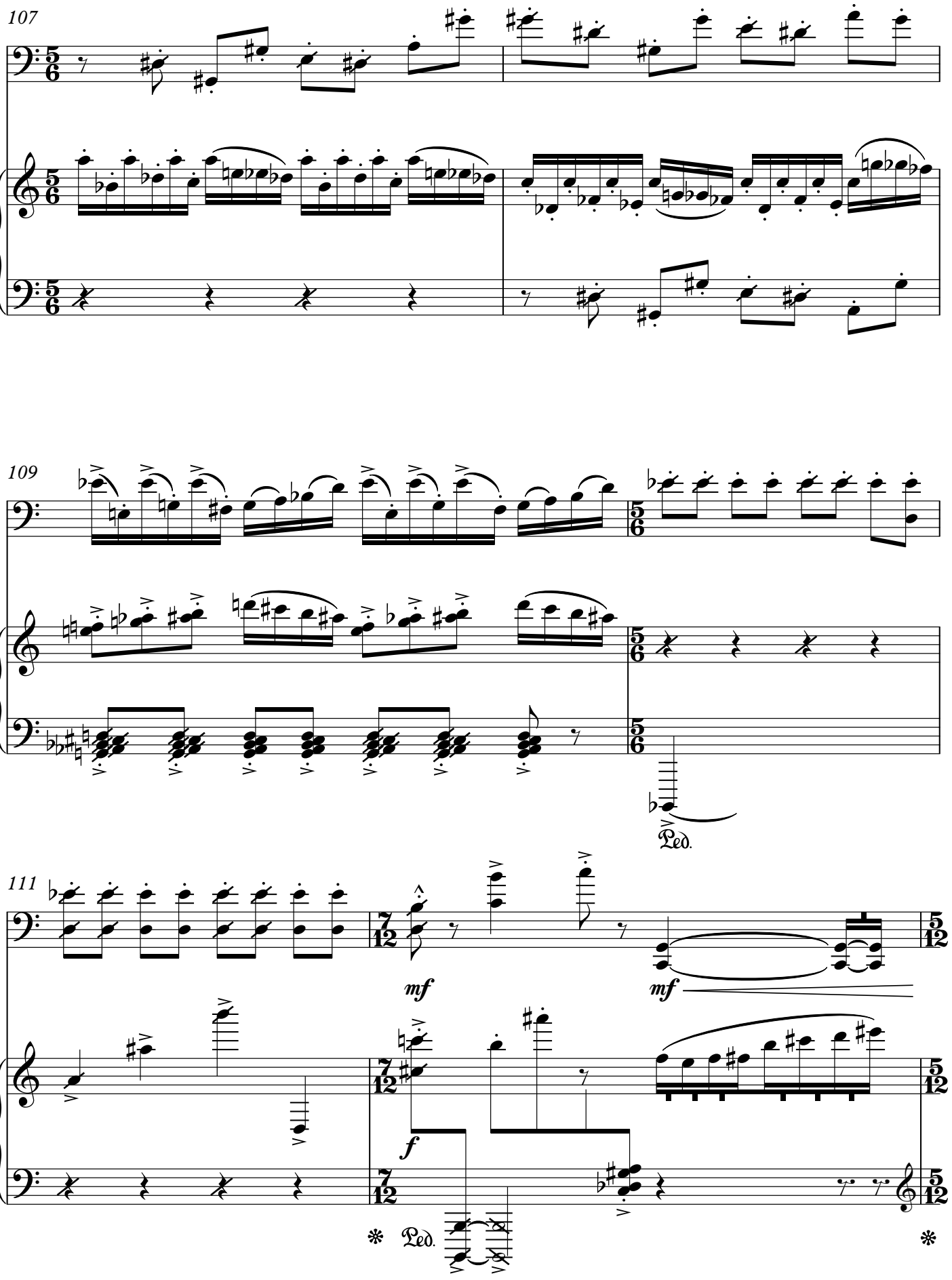
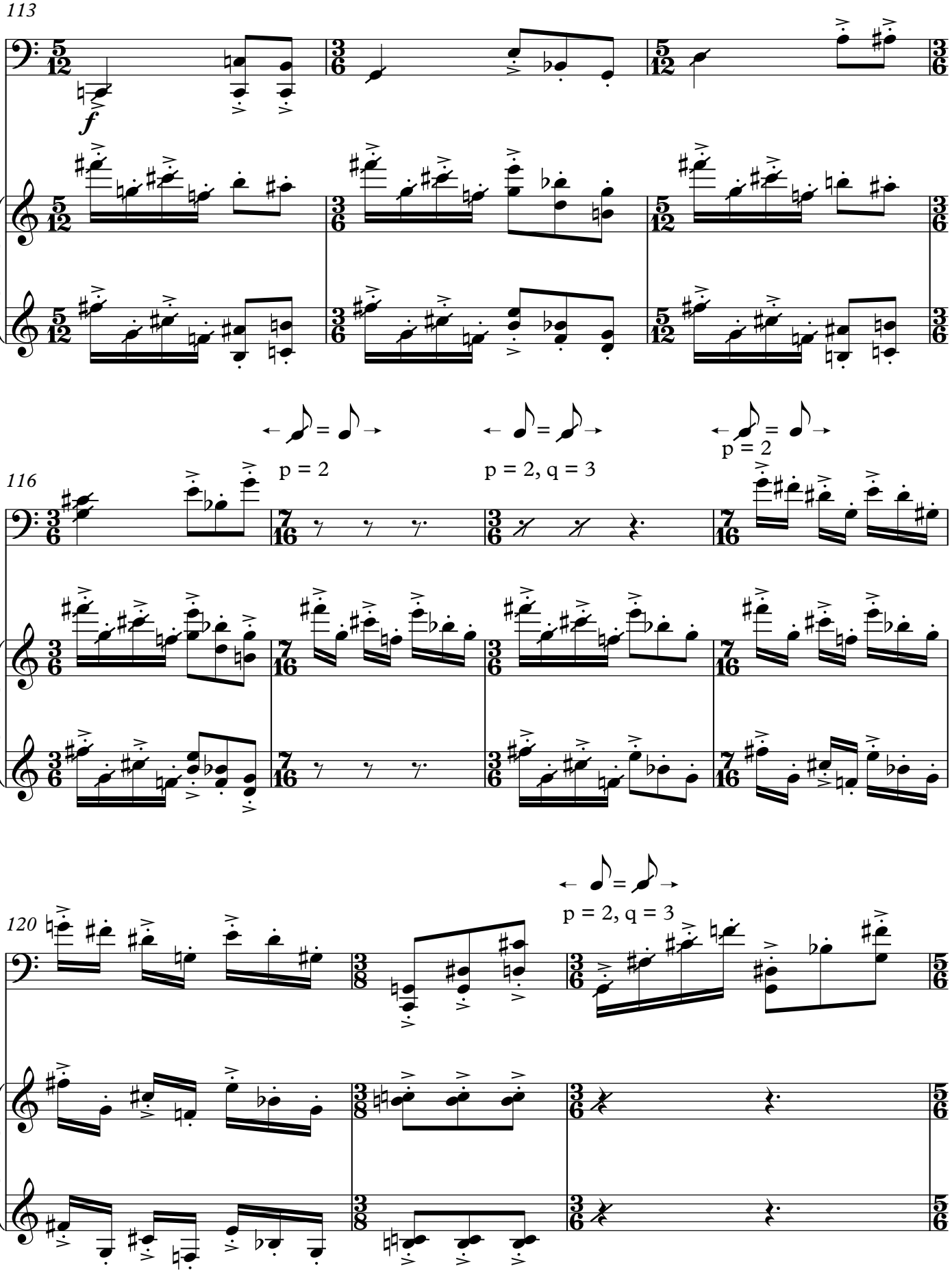
p = 3
p = 3, q = 5
80
p = 3
p = 2, q = 3
loco
82
(p = 2, q = 3)
mp

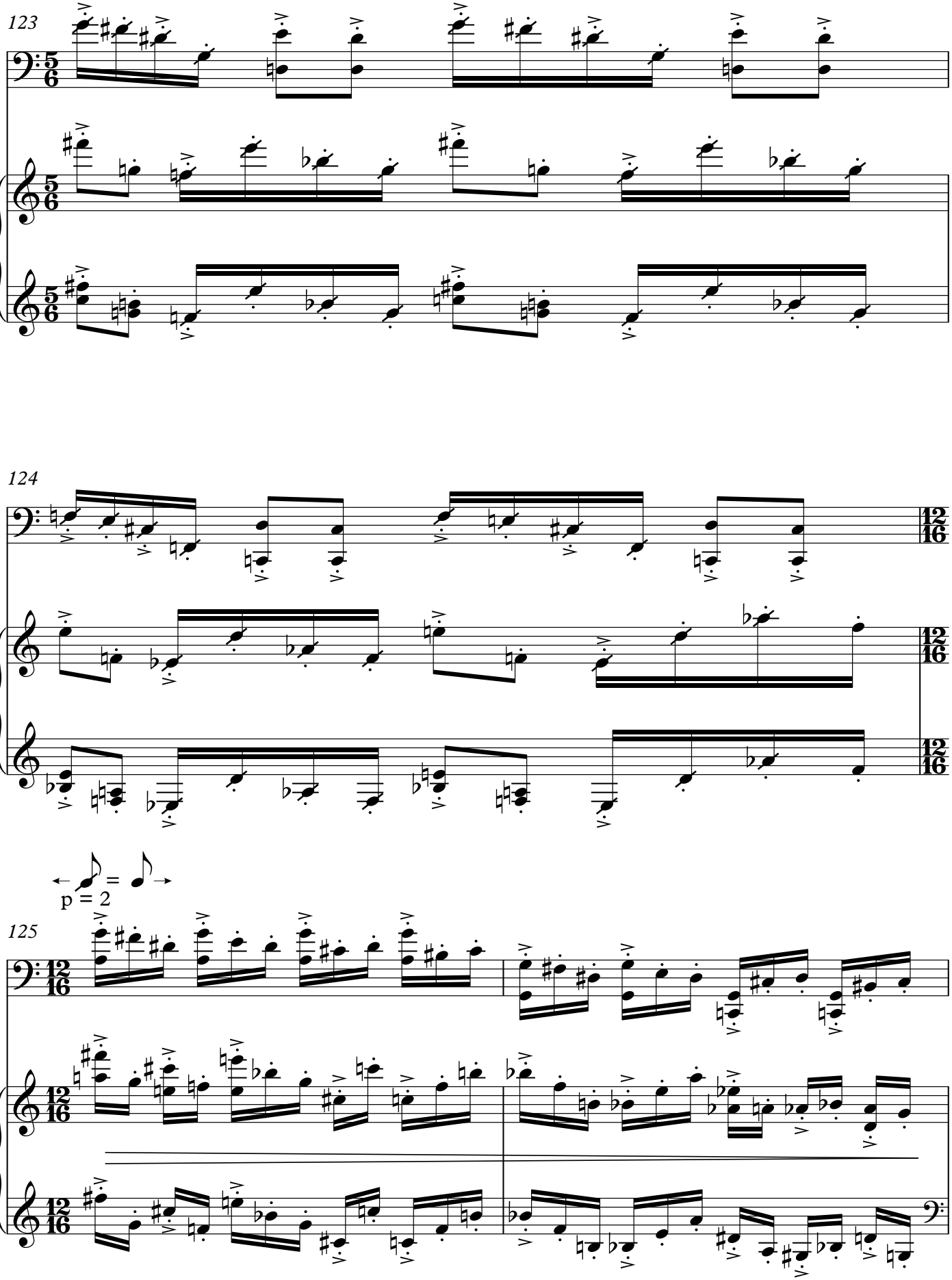

85
88
p = 2
90


p = 2, q = 3
92
95
99
gliss.
mp
p
f


101
Ped.
*
103
Ped.
105
f
f
*


107
109
Ped.
111
mf
mf
f
Ped.


113
f
116
p = 2
p = 2, q = 3
p = 2
120
p = 2, q = 3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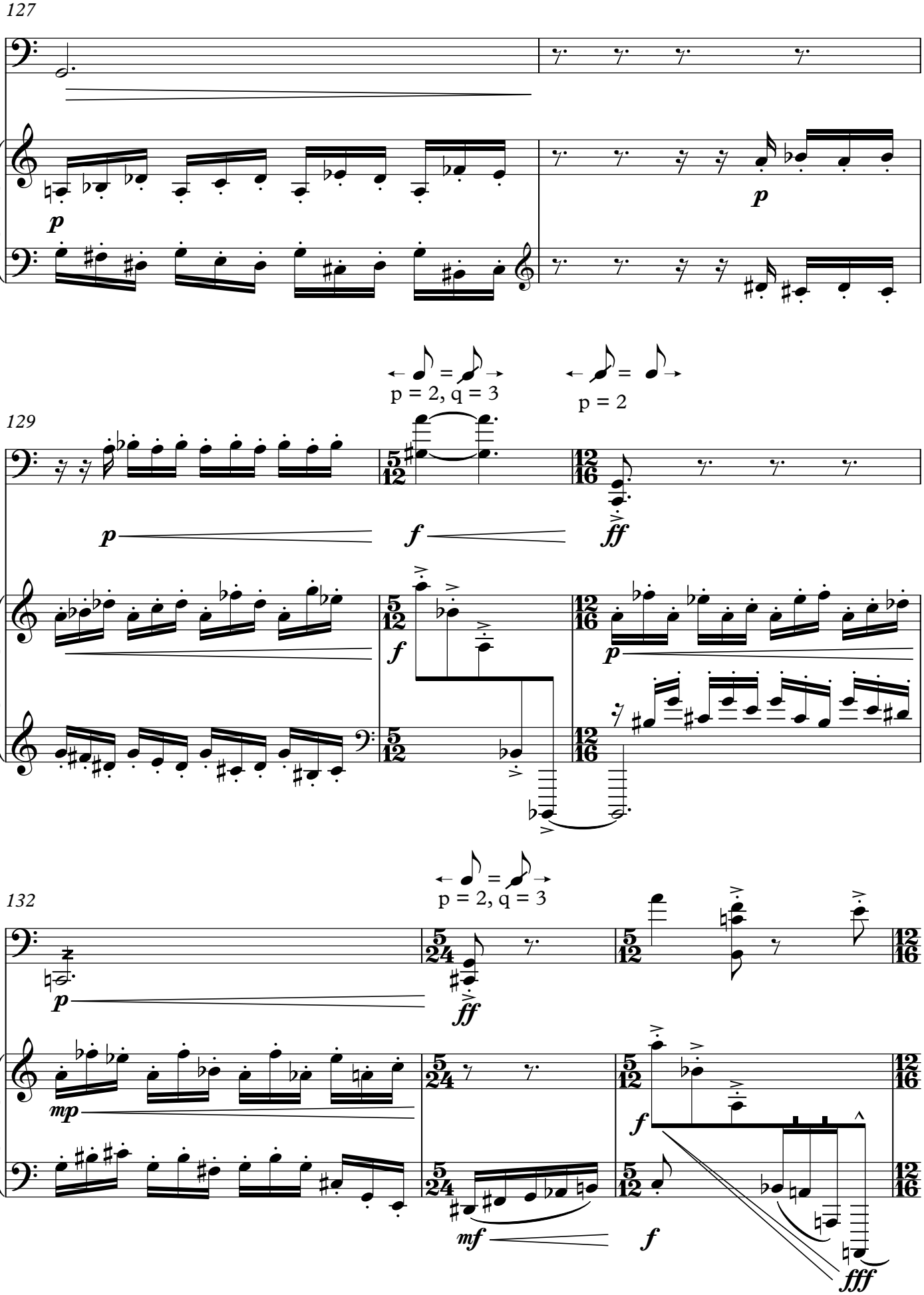
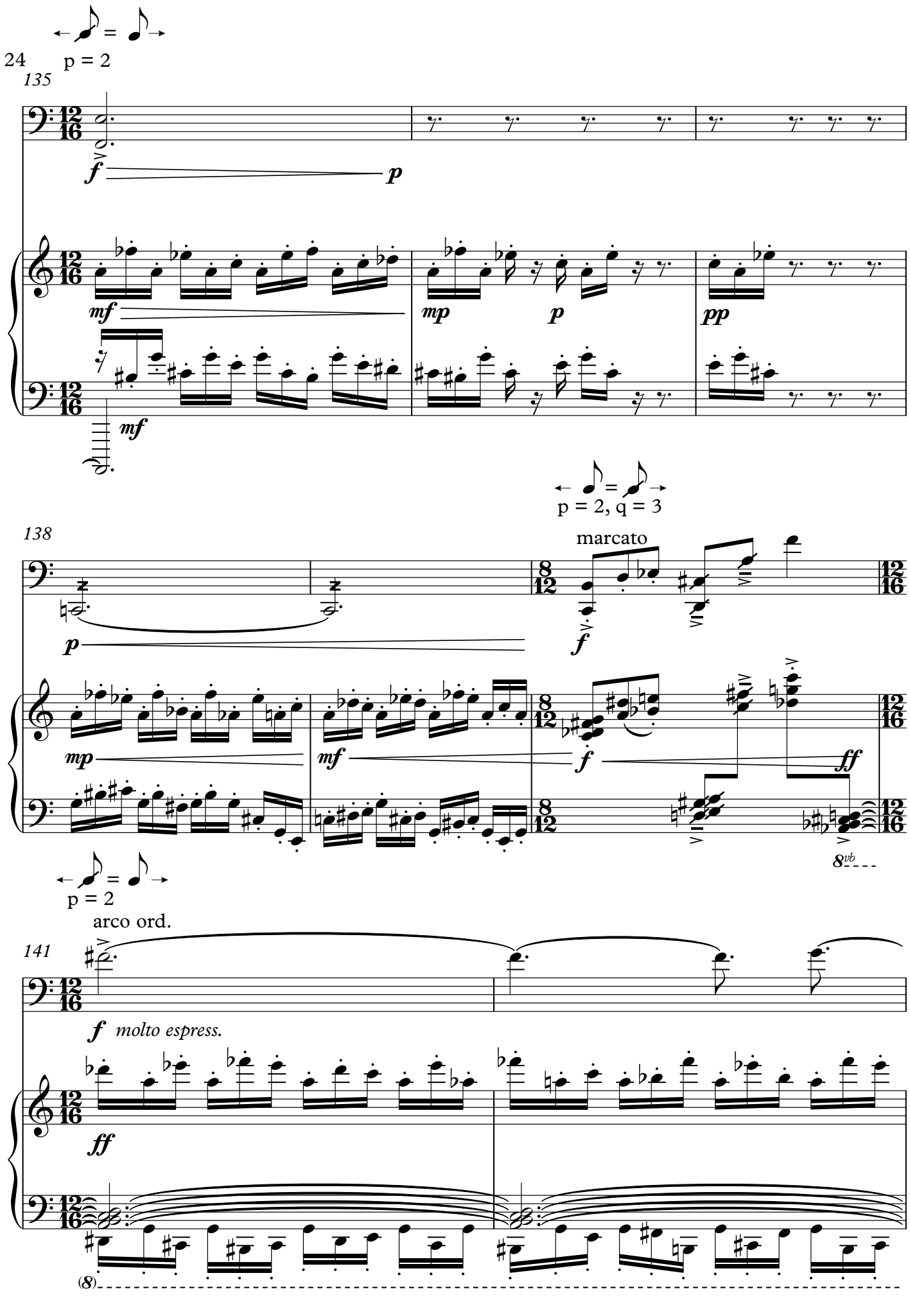
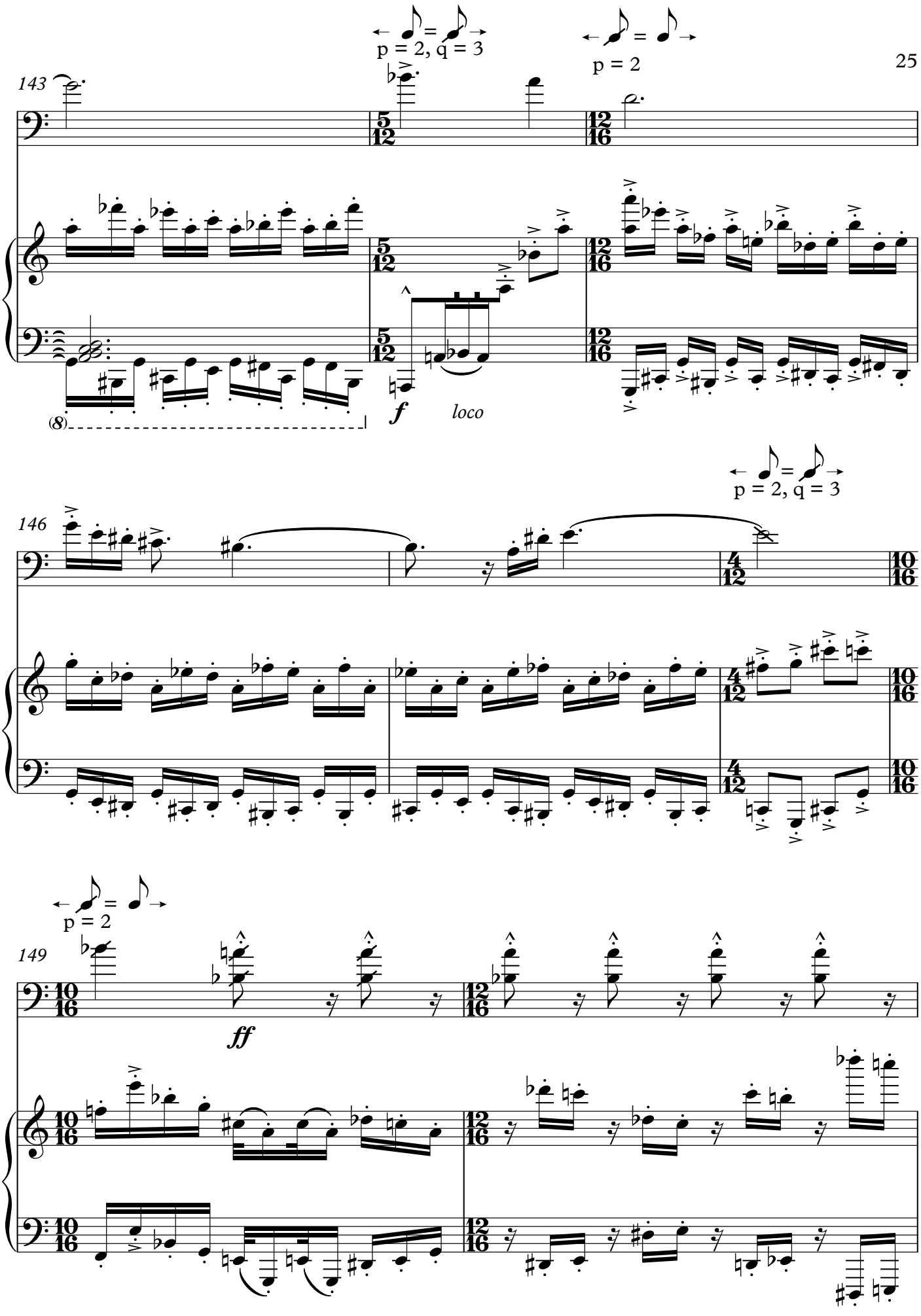
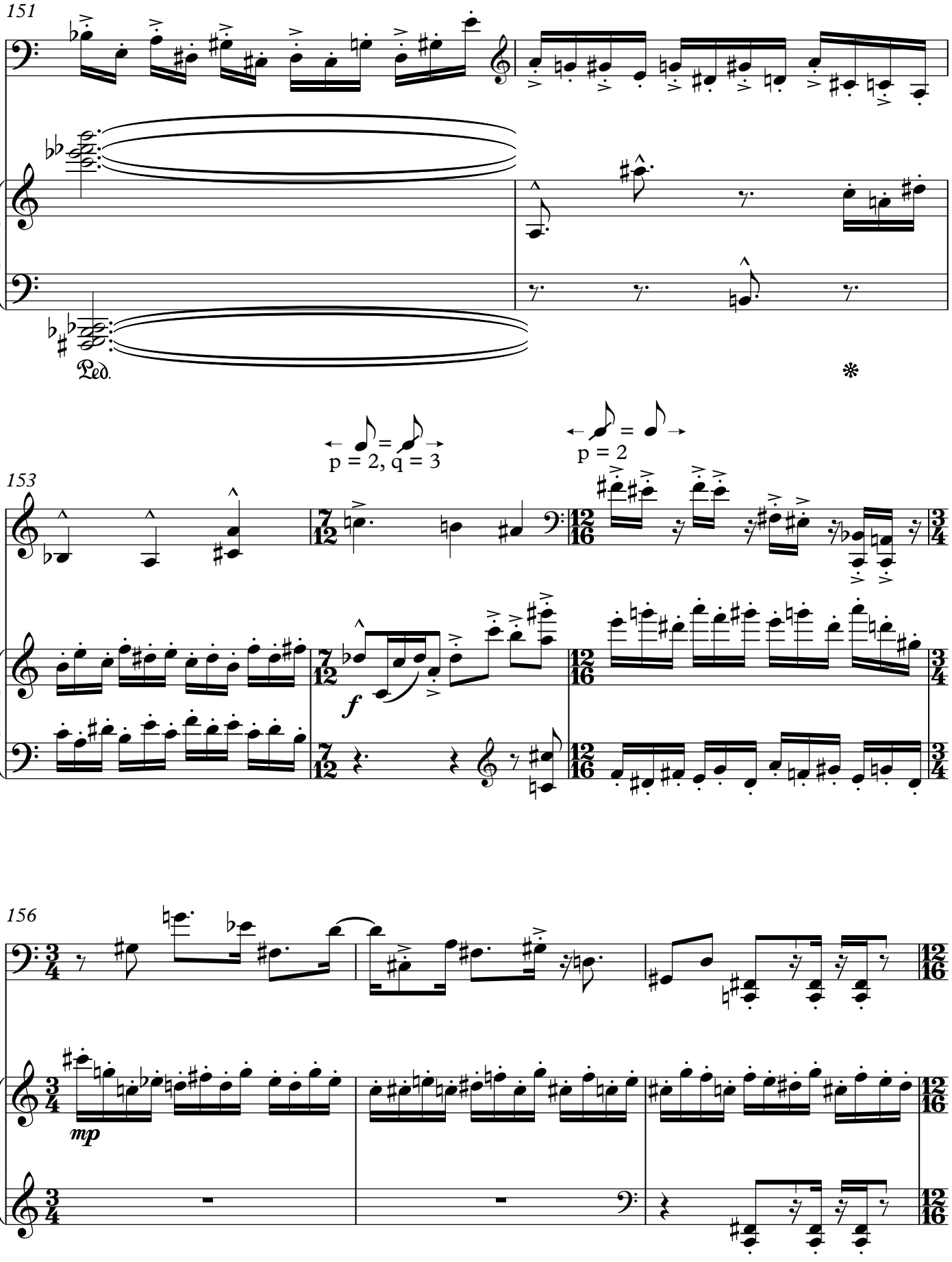
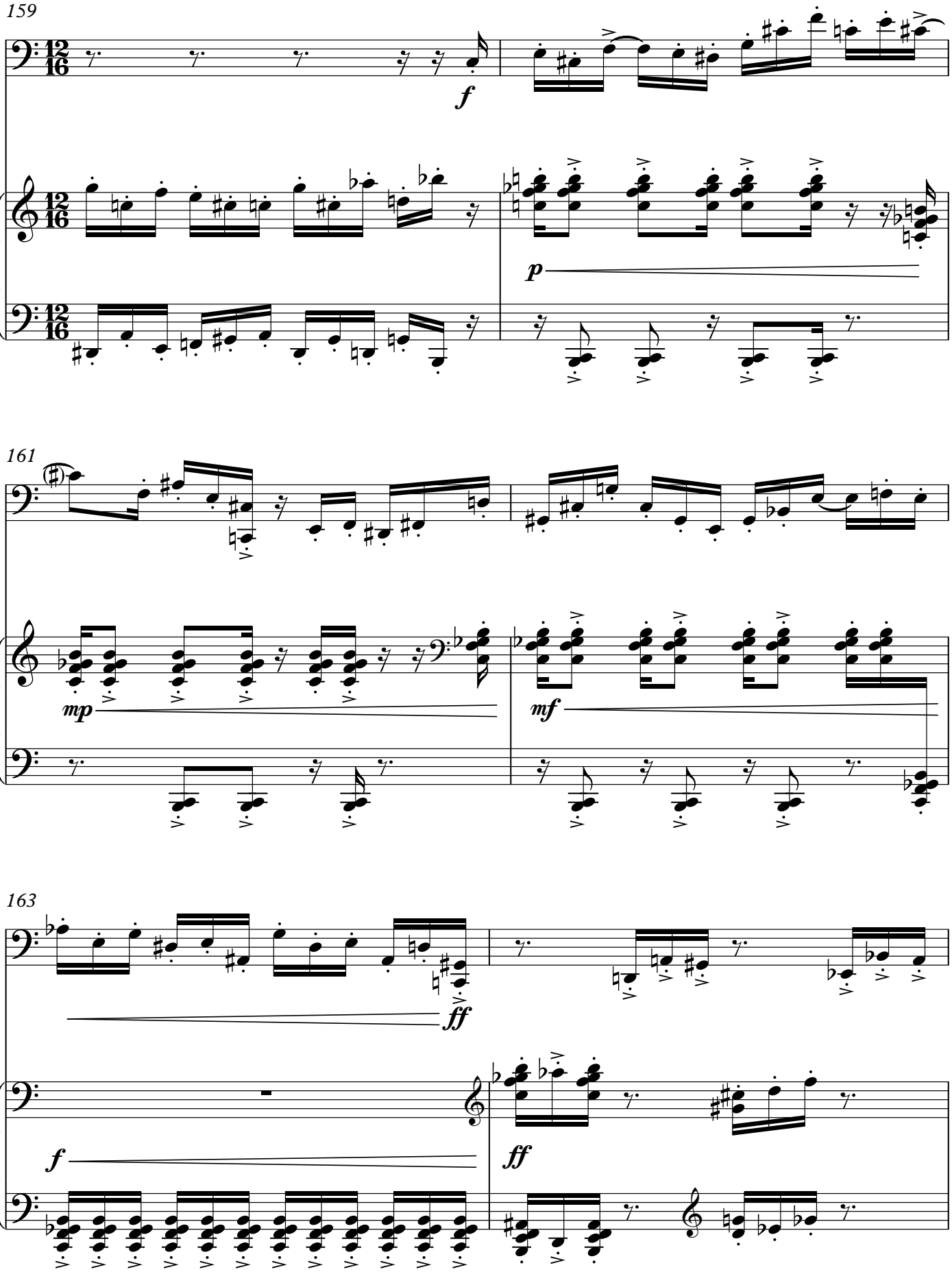
124
p = 2
125

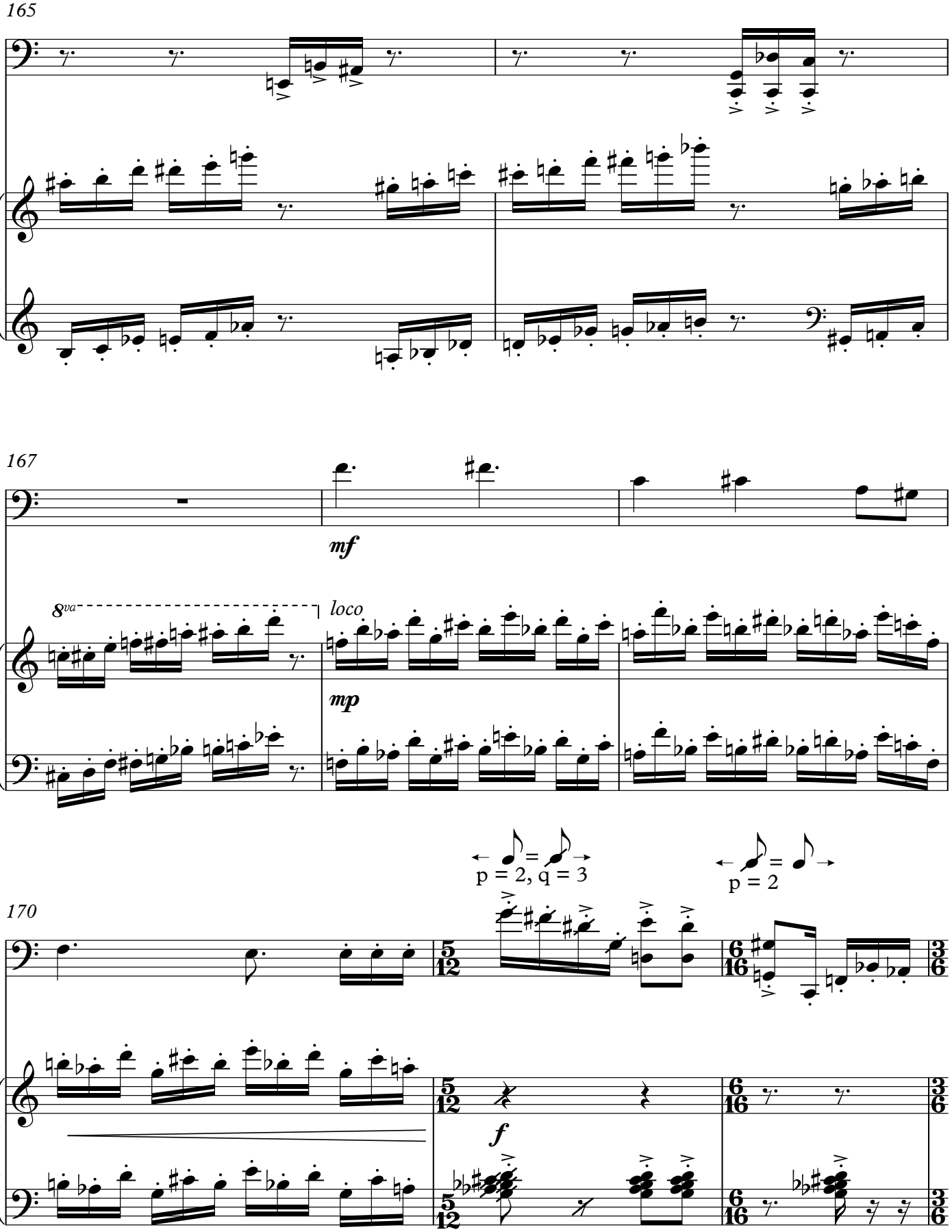

127
p
p
129
p = 2, q = 3
p = 2
p
f
ff
f
p
132
p = 2, q = 3
p
ff
mp
mf
f
f
fff

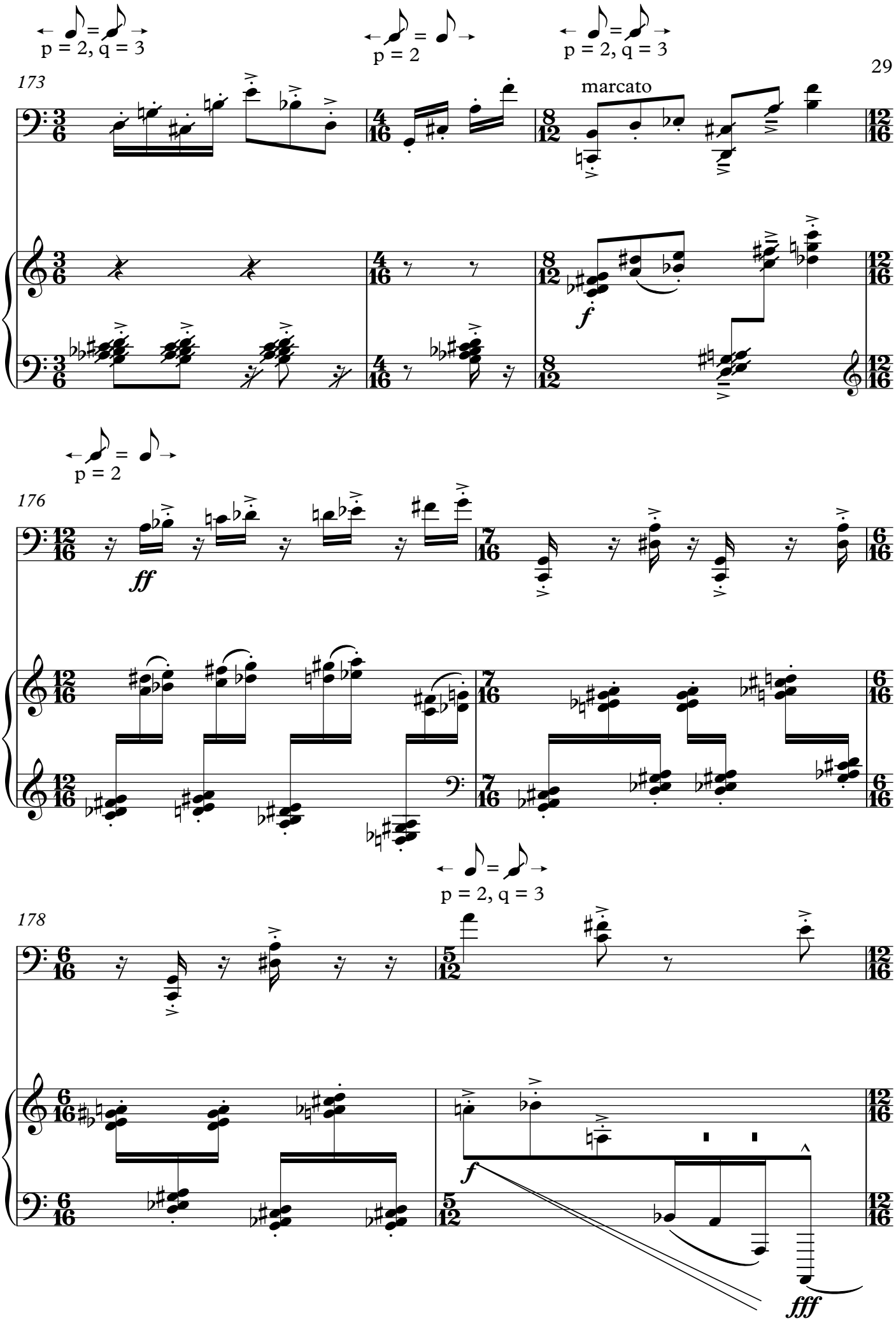

24
p = 2
135
f
p
mf
mp
p
pp
mf
p = 2, q = 3
138
marcato
p
f
mp
mf
f
ff
8vb
p = 2
arco ord.
141
f molto espress.
ff
(8)

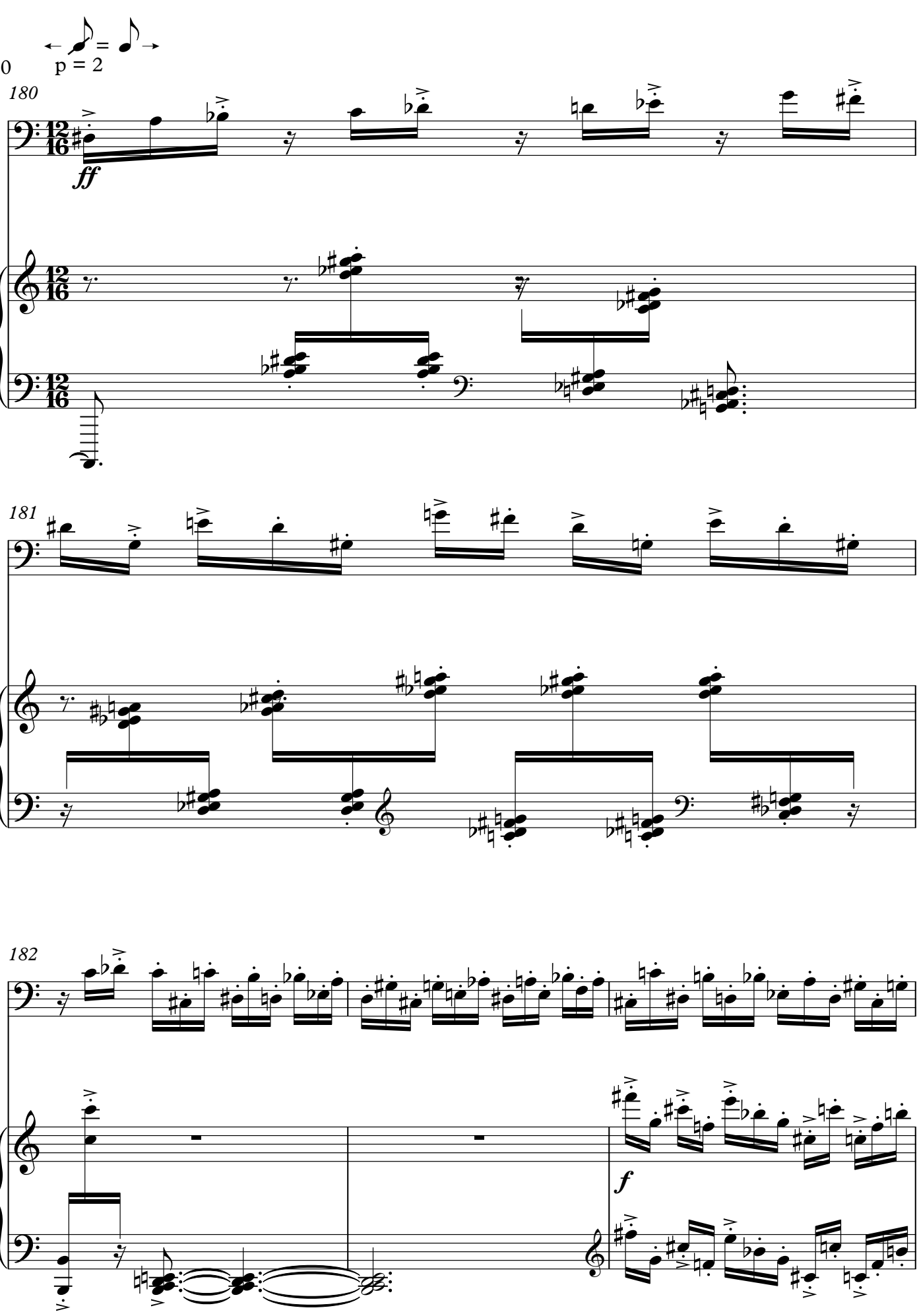

p = 2, q = 3
p = 2
143
f
loco
p = 2, q = 3
146
p = 2
149
ff

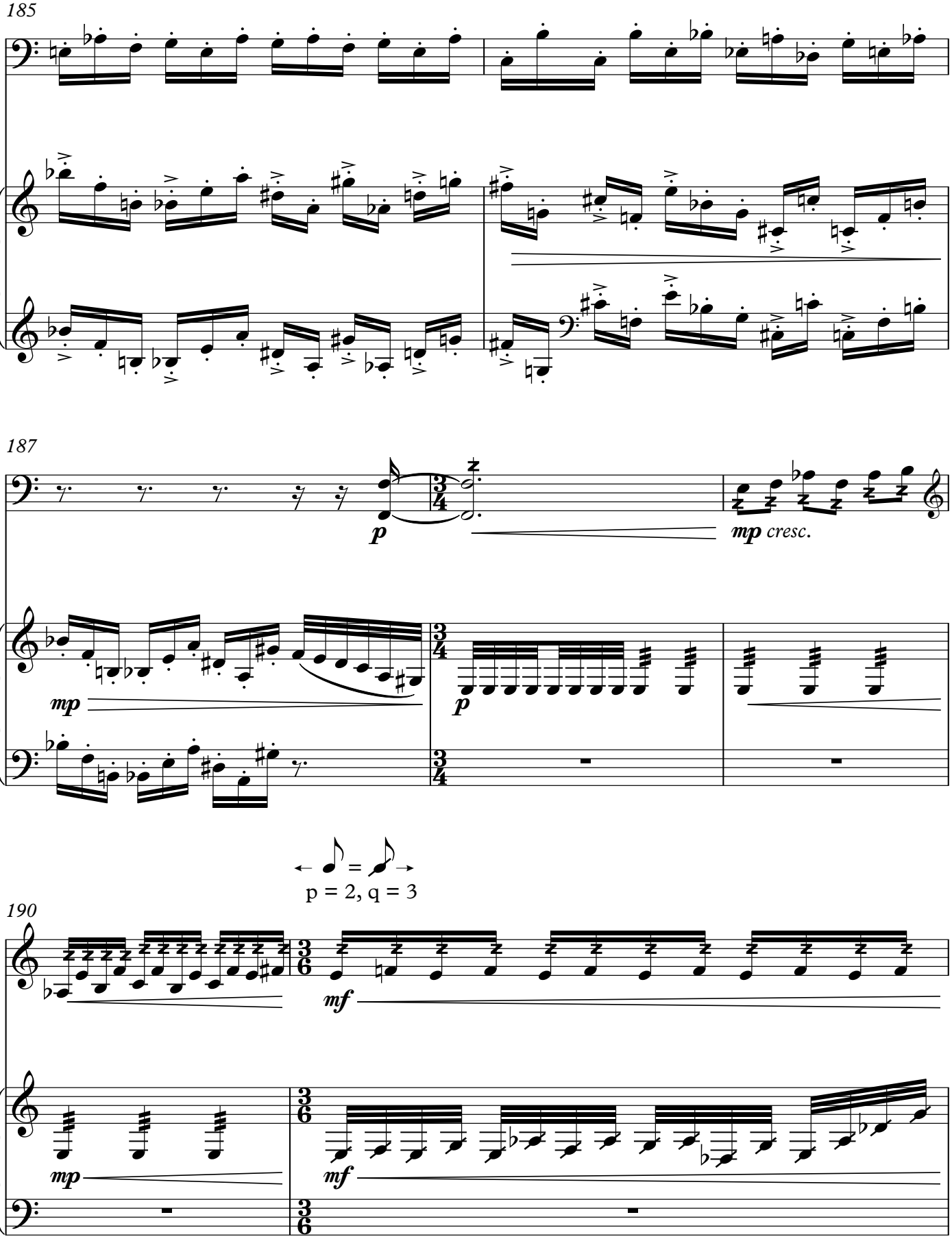

151
Ped.
*
153
p = 2, q = 3
p = 2
f
156
mp


159
f
p
161
mp
mf
163
ff
f
ff


165
167
mf
8va
loco
mp
p = 2, q = 3
p = 2
170
f


p = 2, q = 3
p = 2
p = 2, q = 3
173
marcato
f
p = 2
176
ff
p = 2, q = 3
178
f
fff

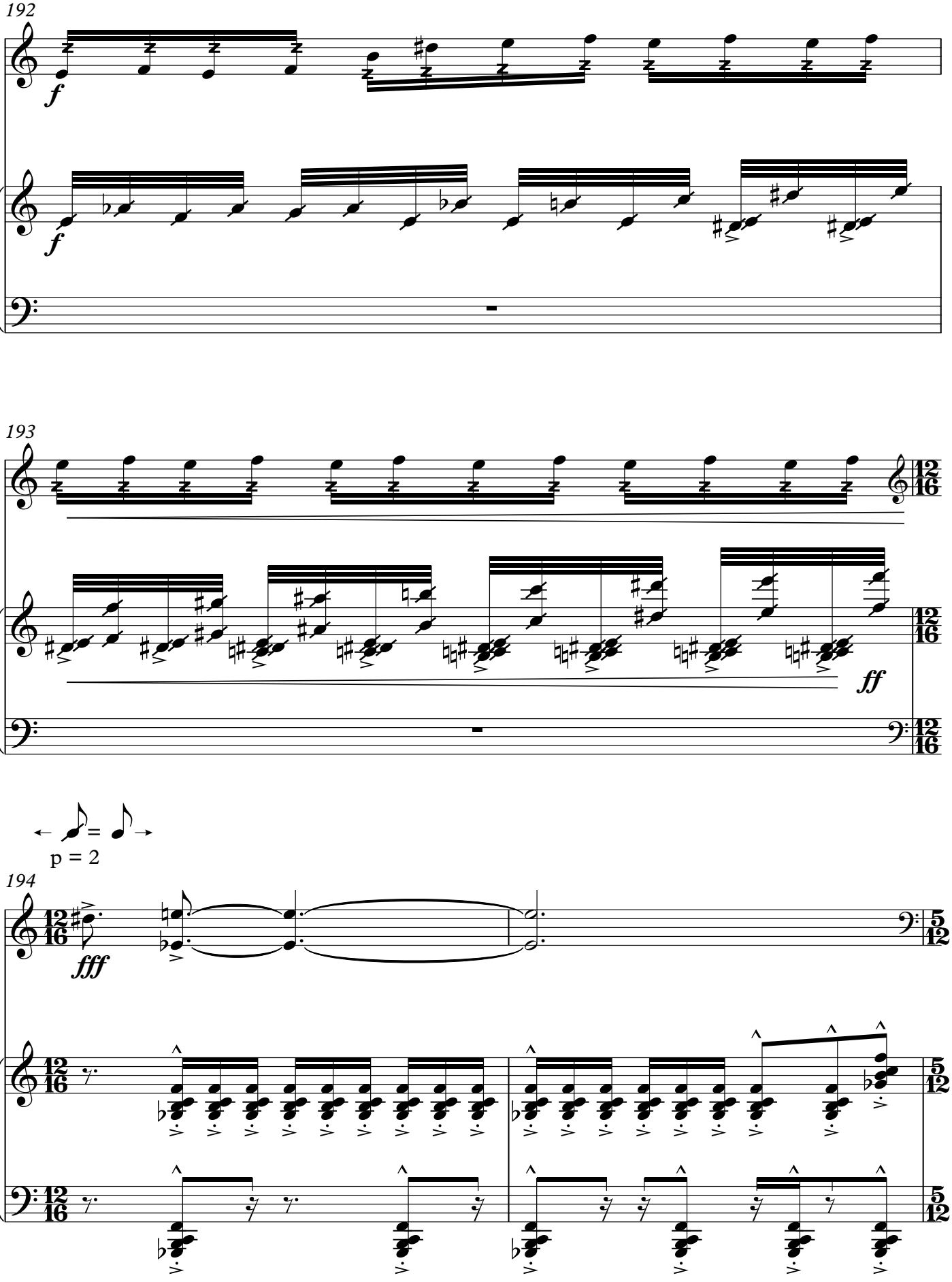

p = 2
180
ff
181
182
f

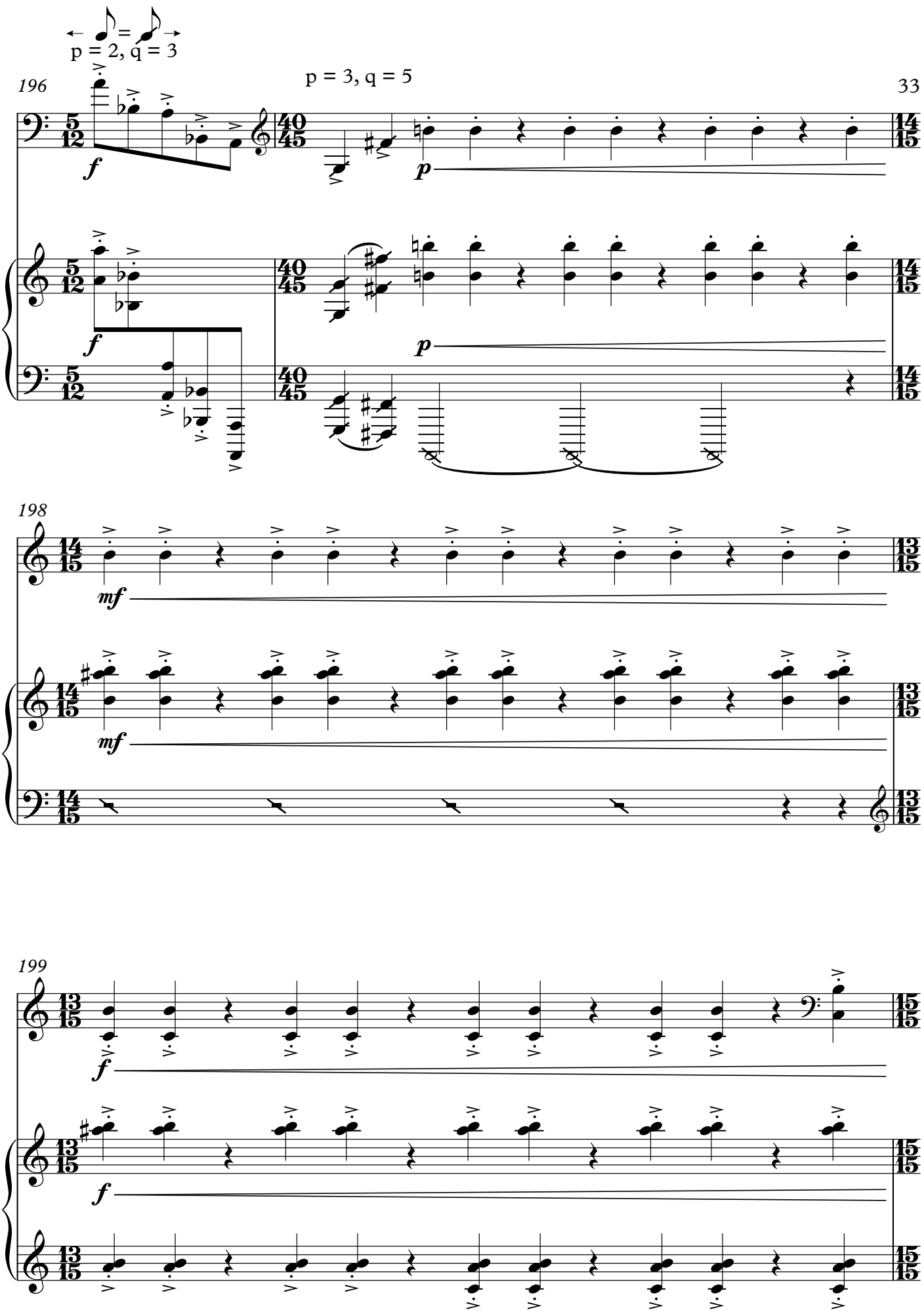

185
187
p
mp cresc.
mp
p
p = 2, q = 3
190
mf
mp
mf

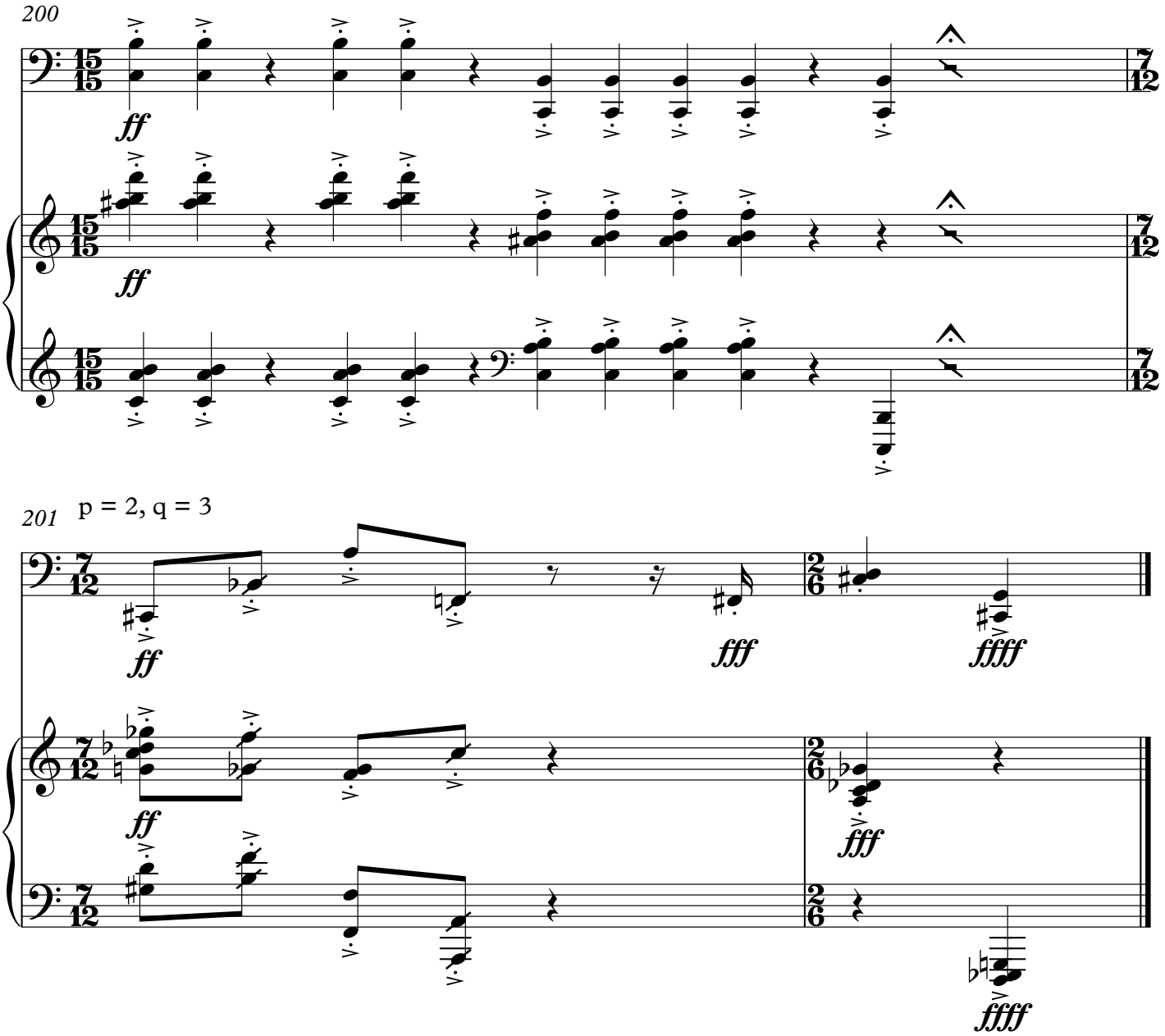
192

193

194




p = 2, q = 3
196
p = 3, q = 5
198
199


200
ff
ff
ff
201
p = 2, q = 3
ff
fff
ffff
ff
fff
ffff