Karl Hinze

Reflections on Euler

for string quartet

2009

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Reflections on Euler (2009) is a piece for string quartet in five movements, each inspired by one term of a famous formula named after Swiss mathematician Leonhard Euler. *Euler's Identity* states that $e^{i\pi} + 1 = 0$. This equation is remarkable for its simplicity and elegance as well as its comprehensiveness, as it connects key ideas from the fields of algebra, calculus, probability, geometry, and complex-number analysis. After proving the identity in a lecture, noted 19th century mathematician Benjamin Peirce said, "It is absolutely paradoxical; we cannot understand it, and we don't know what it means, but we have proved it, and therefore we know it must be the truth."

The first movement, *e*, is structured around an energetic theme that swells and grows, as the number *e* is used to calculate rates of growth. The second movement, *i*, is for the imaginary number, $\sqrt{-1}$. This movement explores a mysterious web of interweaving violin melodies while the viola and cello provide a regular rhythmic base (inspired by the cyclic powers of *i*). The relationship between circles and lines informs the third movement, π: the cello and viola traverse long melodic lines while the violins pluck "circular" patterns around them. The fourth movement, *+ 1*, is simply one of unstoppable expansion, and the final movement, *= 0*, explores motives from the previous four movements, playing them against one another in discordant ways until, from the chaos, we arrive at a place of order and harmony.

Karl Hinze
November 2009
Worcester, Massachusetts

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e

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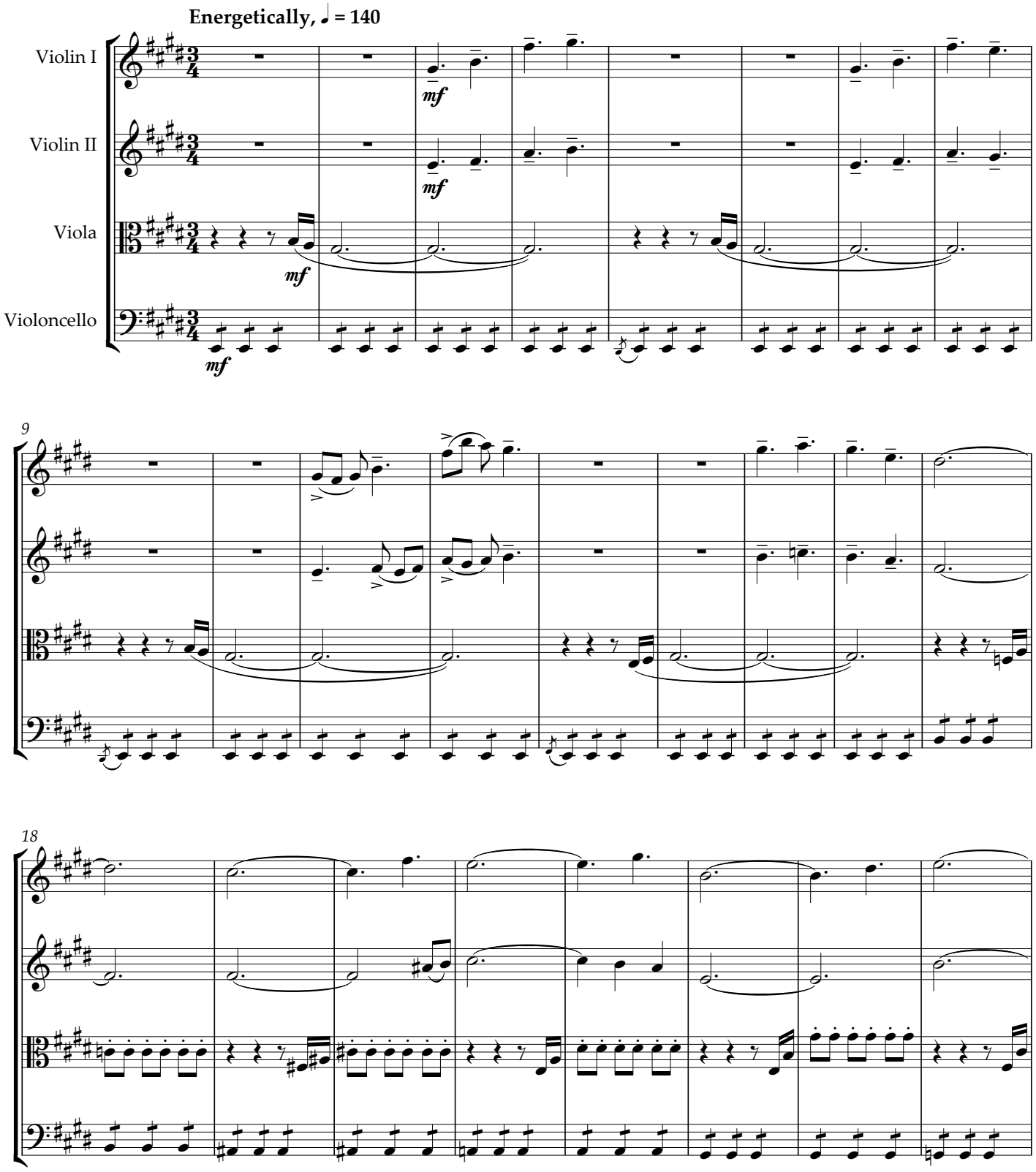

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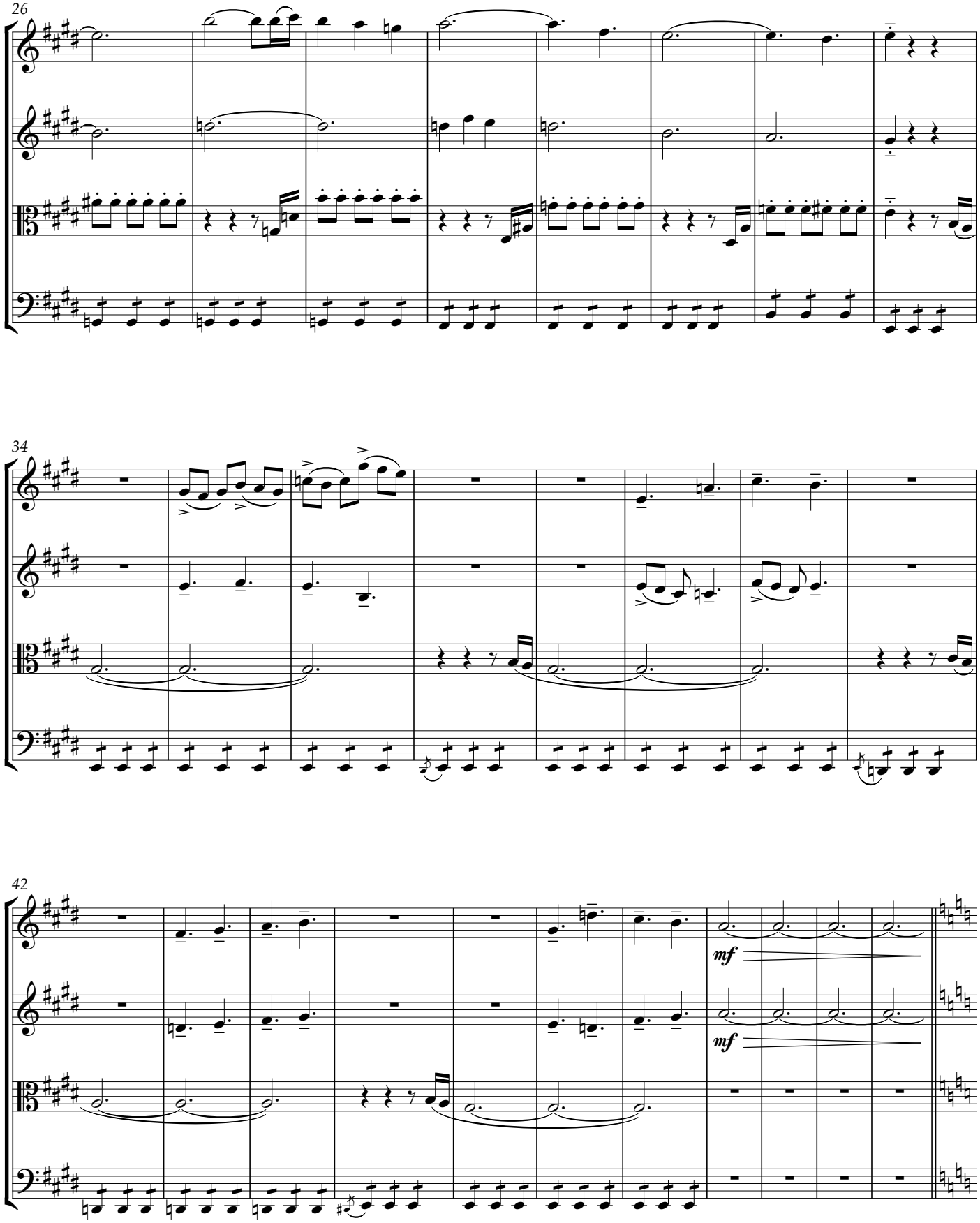
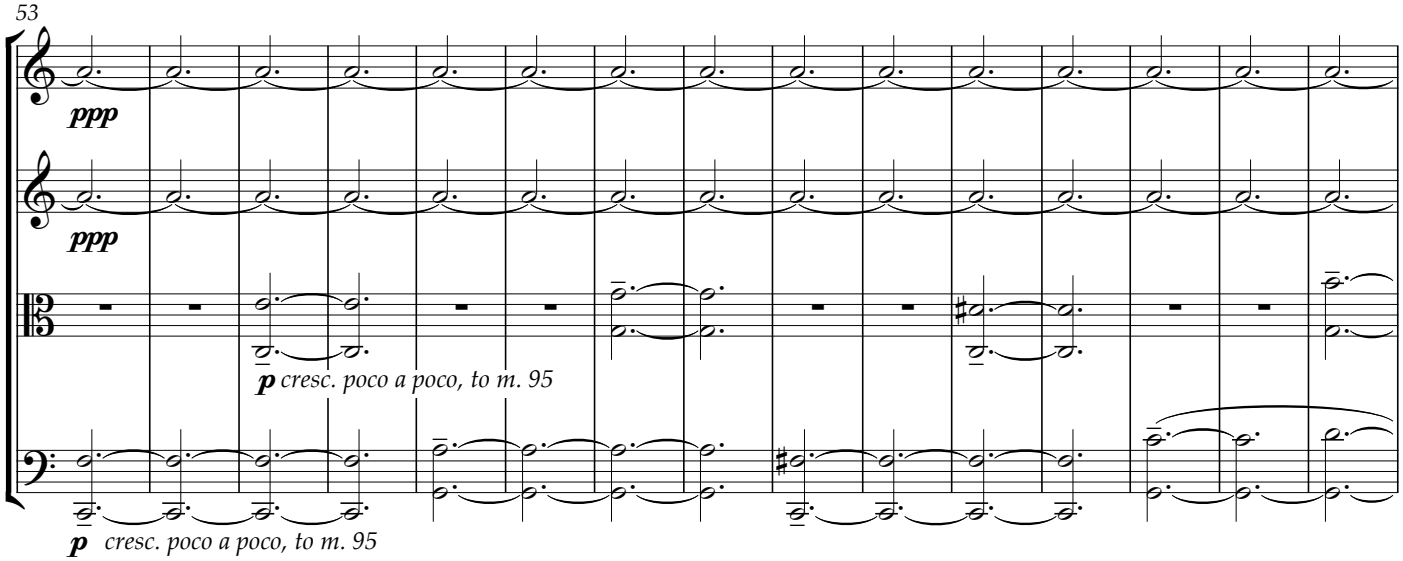
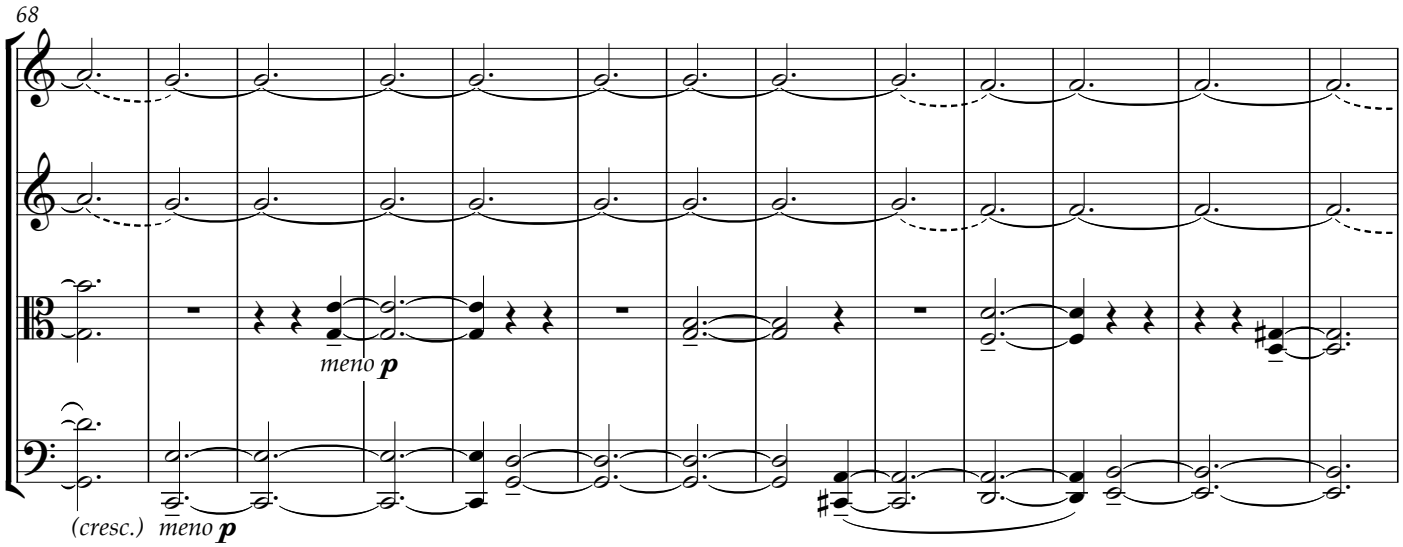
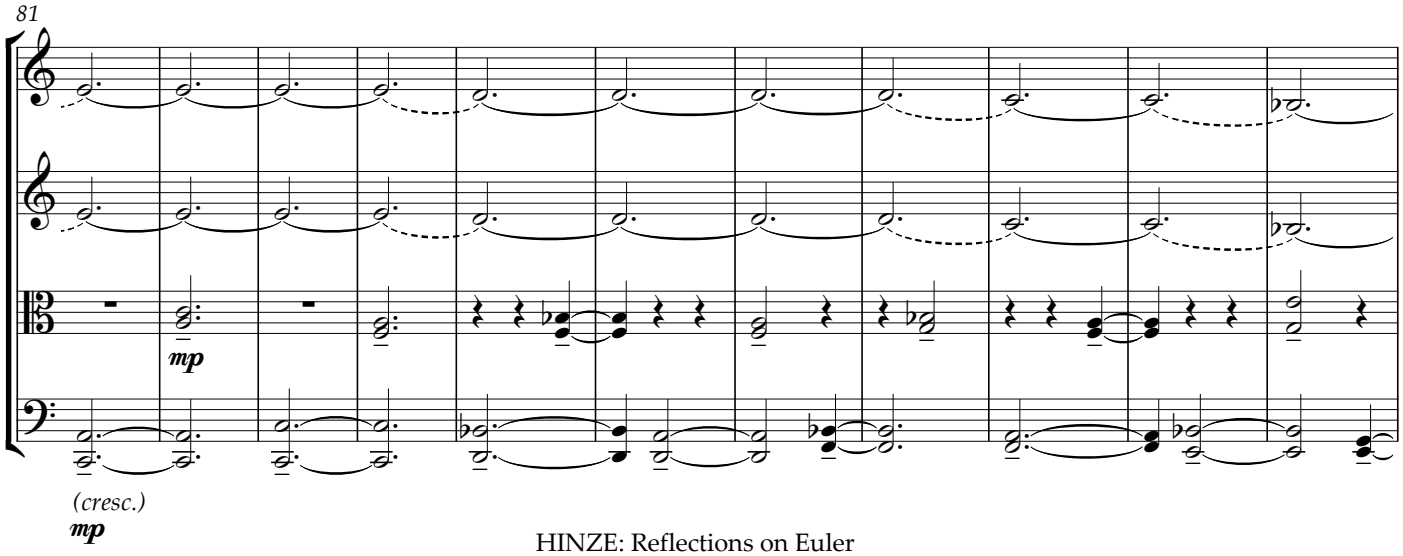
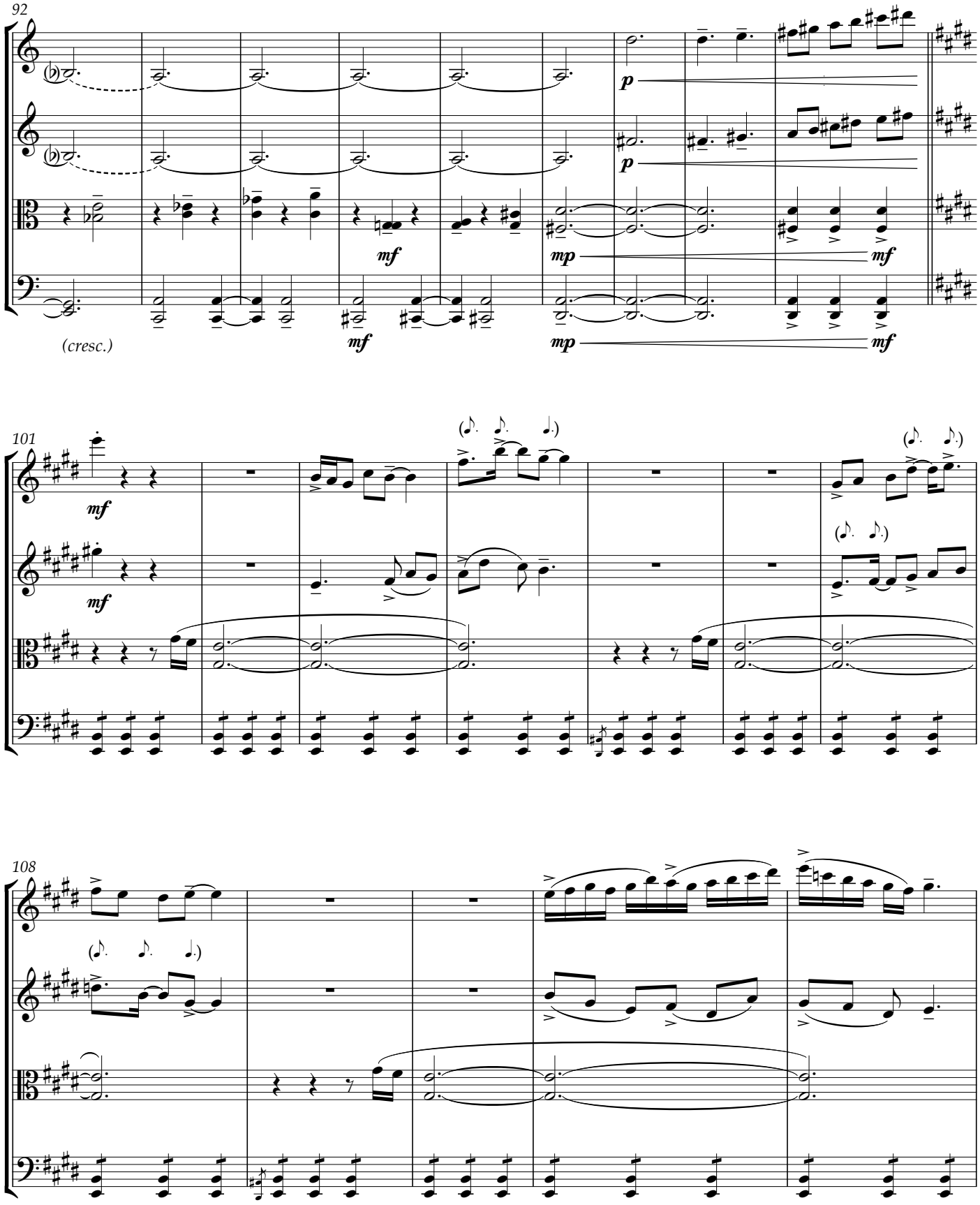
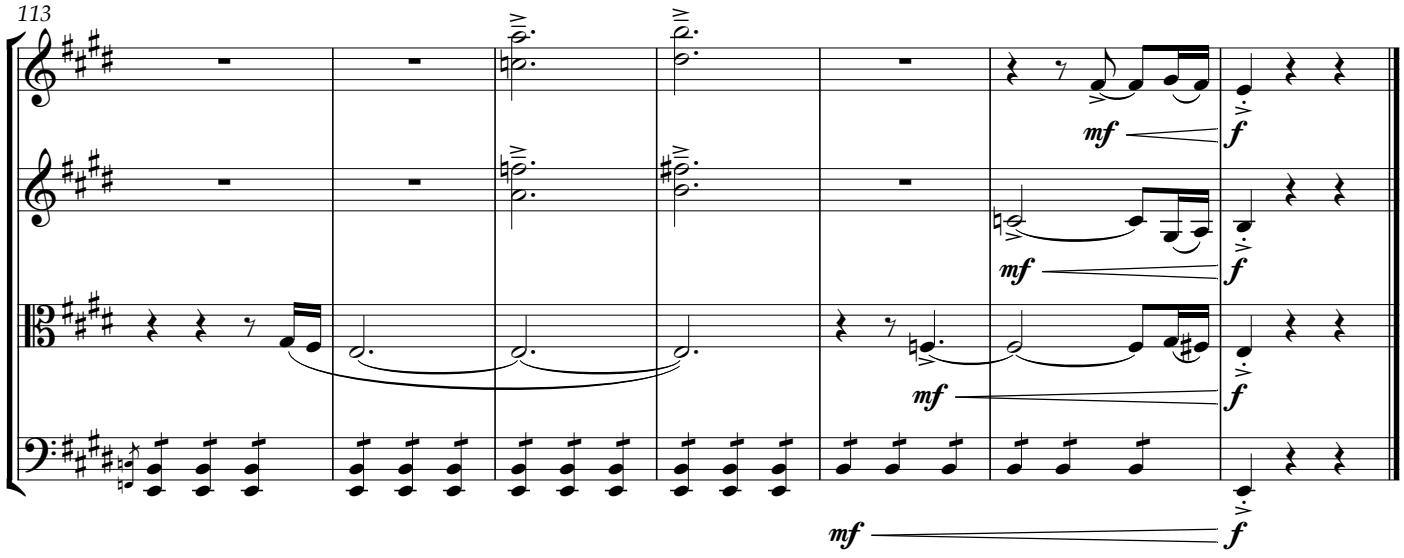

26
34
42
mf
mf


53
ppp
ppp
p cresc. poco a poco, to m. 95
p cresc. poco a poco, to m. 95

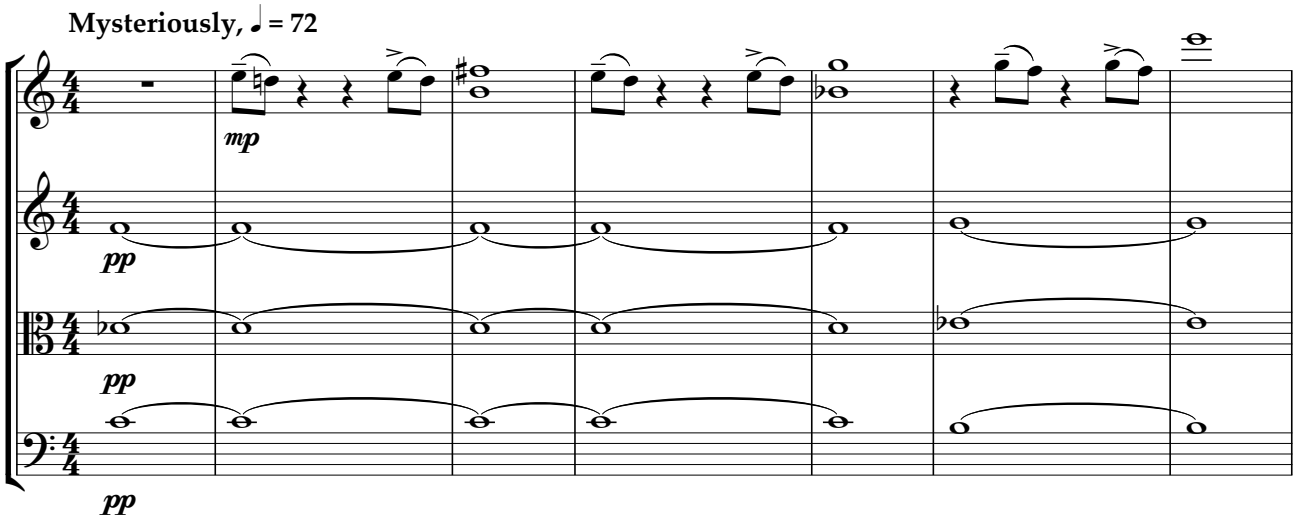

68
meno p
(cresc.) meno p

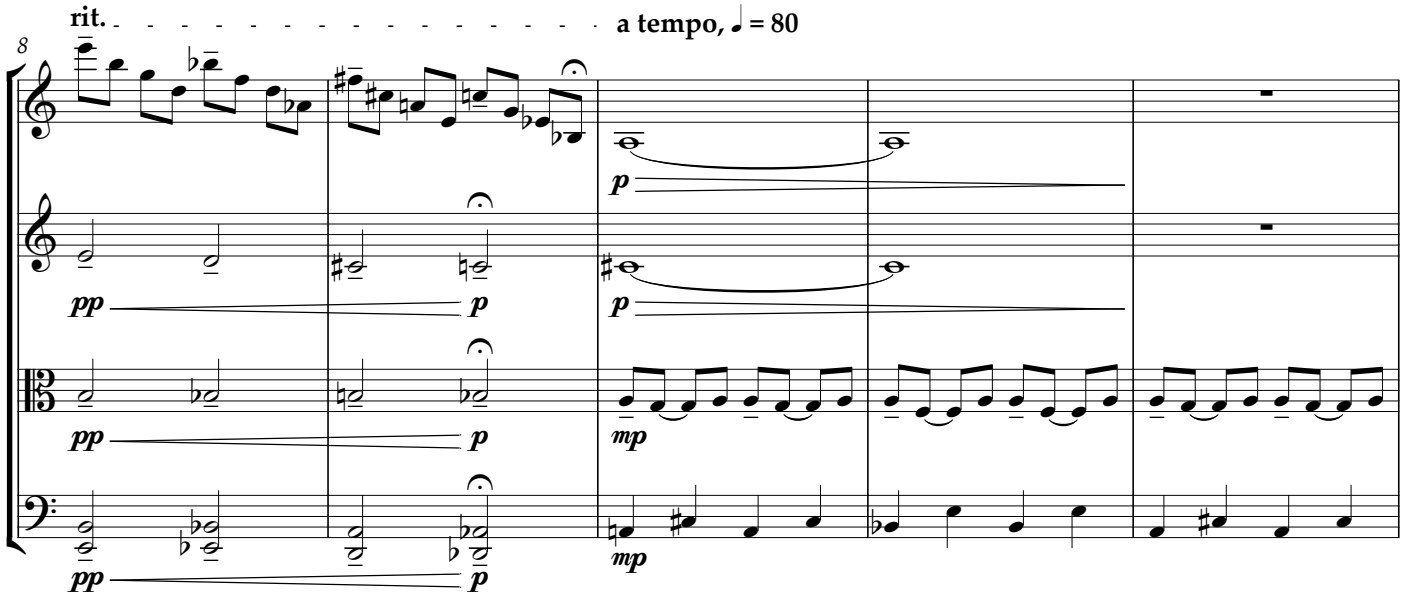

81
mp
(cresc.)
mp

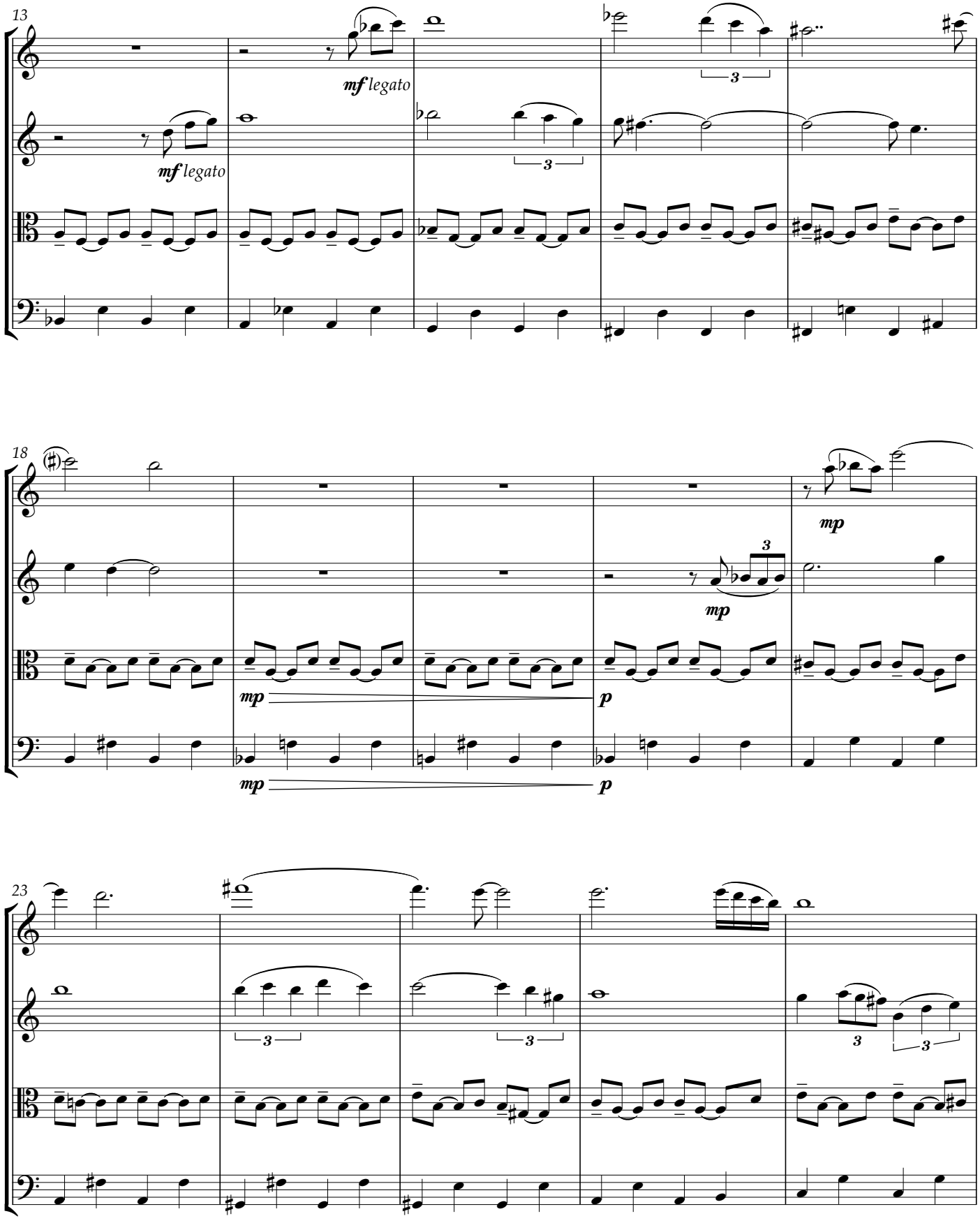

92
(cresc.)
101
108

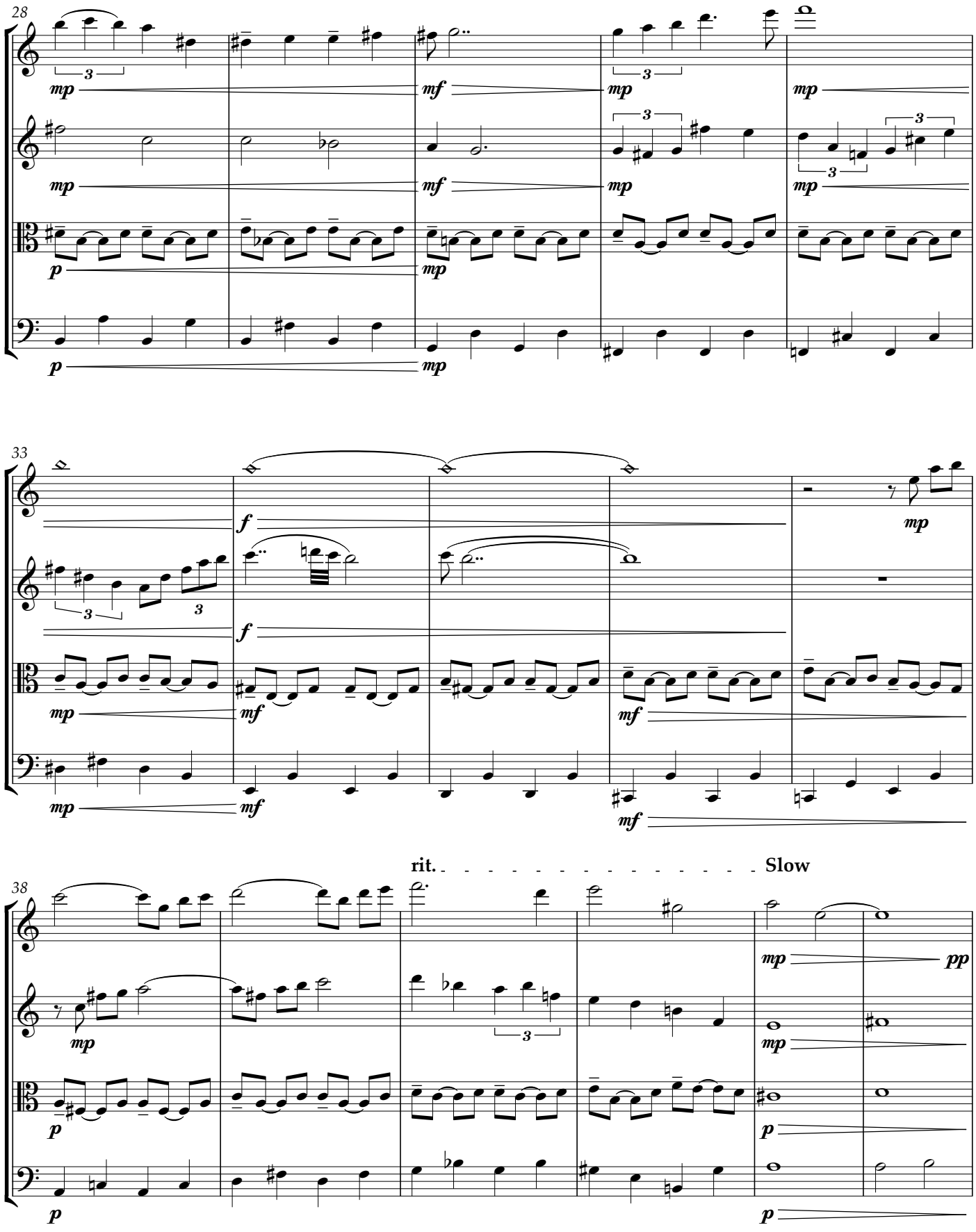

113
mf
f
mf
f
mf
f
mf
f

i


Mysteriously, ♩ = 72
mp
pp
pp
pp


rit.
a tempo, ♩ = 80
8
p
pp
p
p
pp
p
mp
pp
p
mp


13
mf legato
mf legato
3
3
18
mp
3
mp
mp
p
mp
p
23
3
3
3
3


28
33
38
rit.
Slow

As before, ♩ = 72

44

mp *p* *pp*

pp

pp *ppp*

pp *ppp*

pp *ppp*

π

♩ = 140, never rushed

pizz., *l.v. sempre*

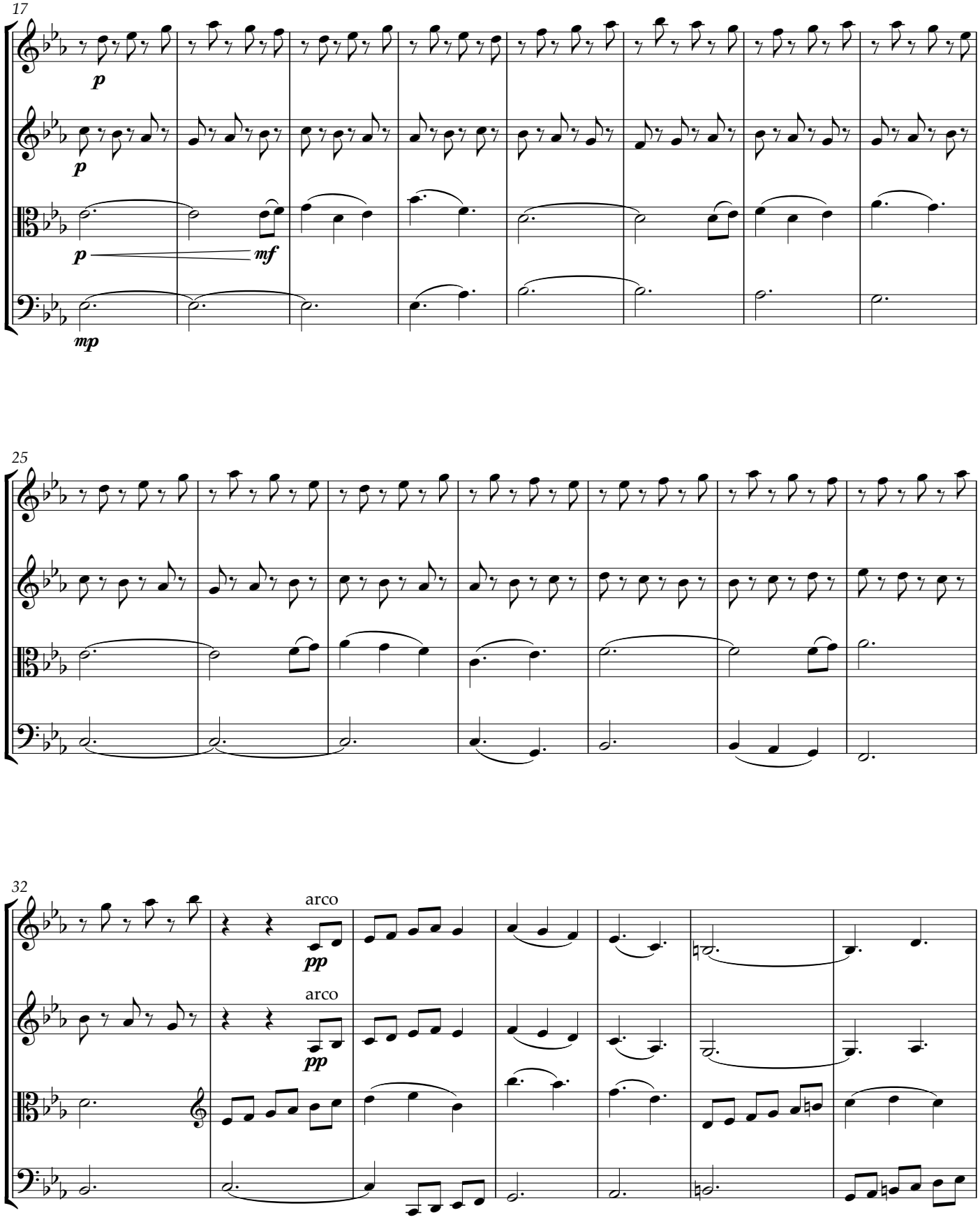
mp

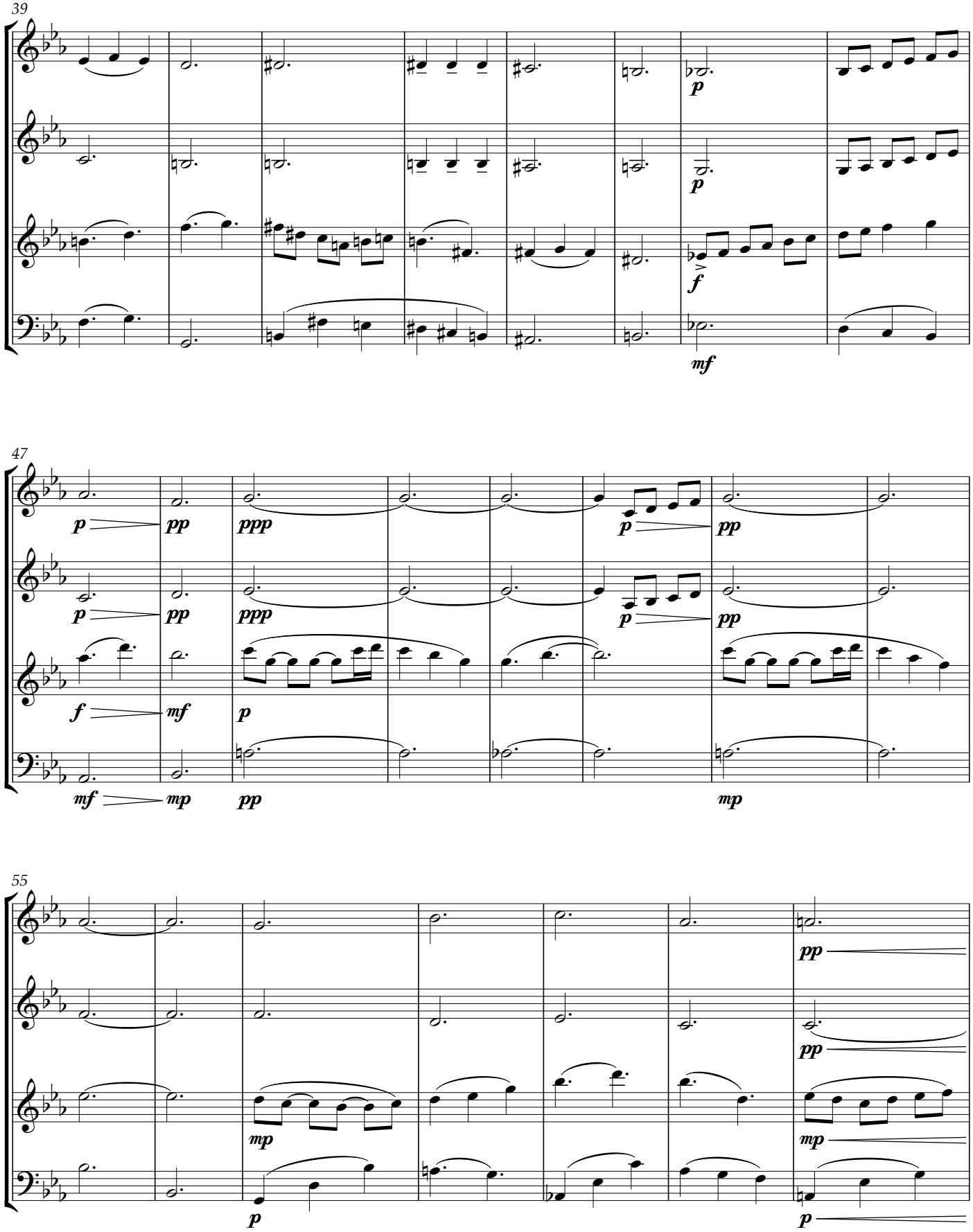
pizz., *l.v. sempre*

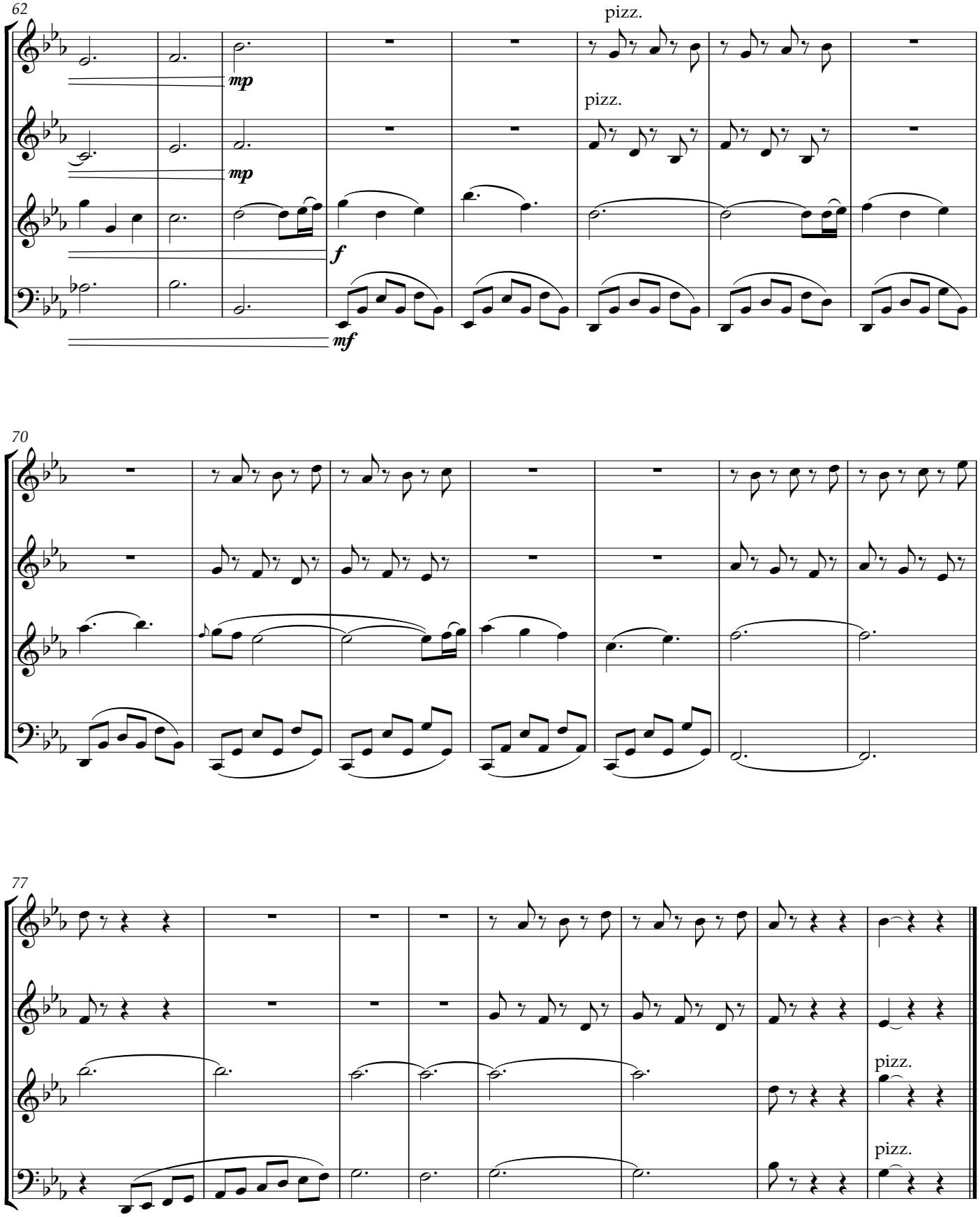
mp

mp

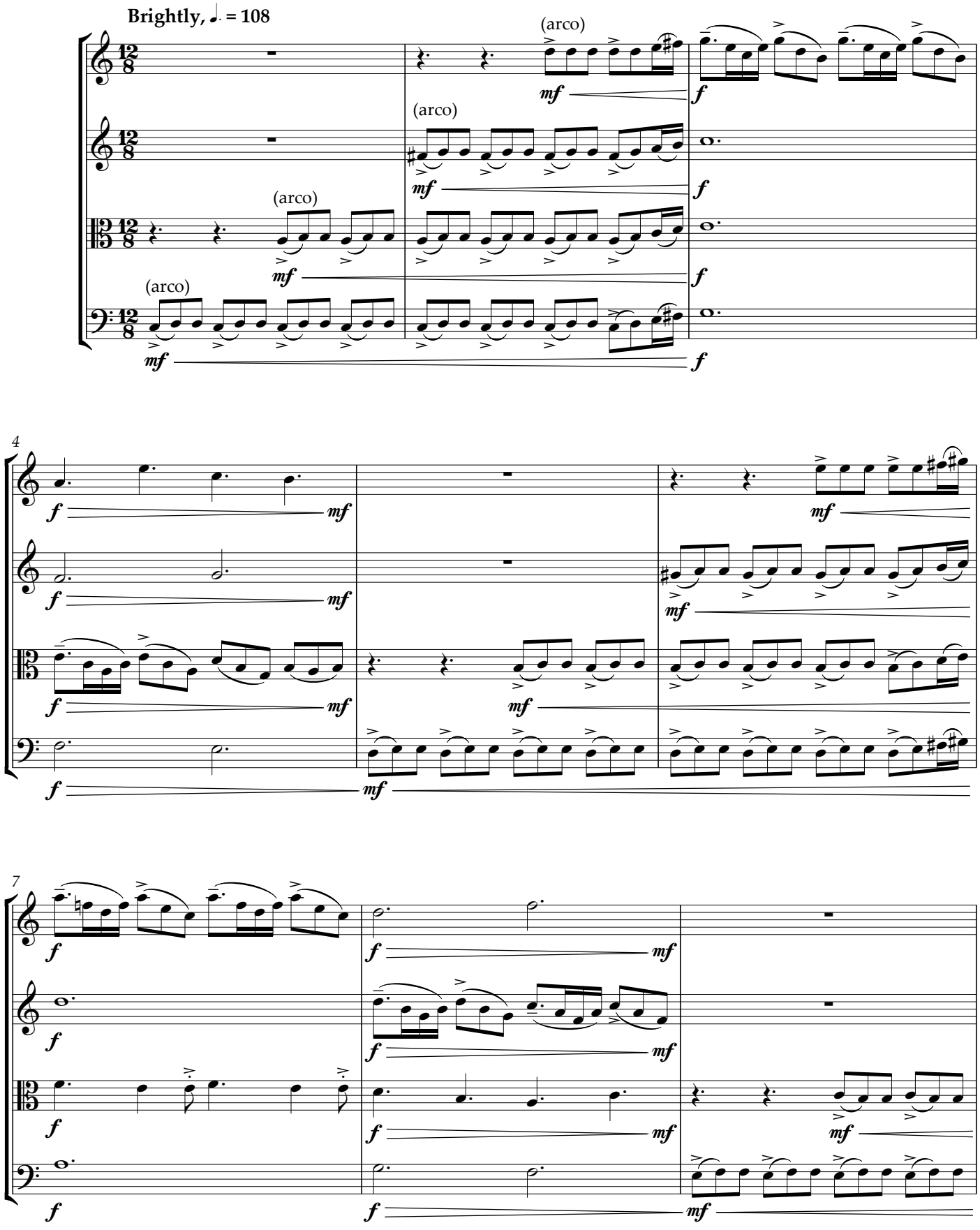
8

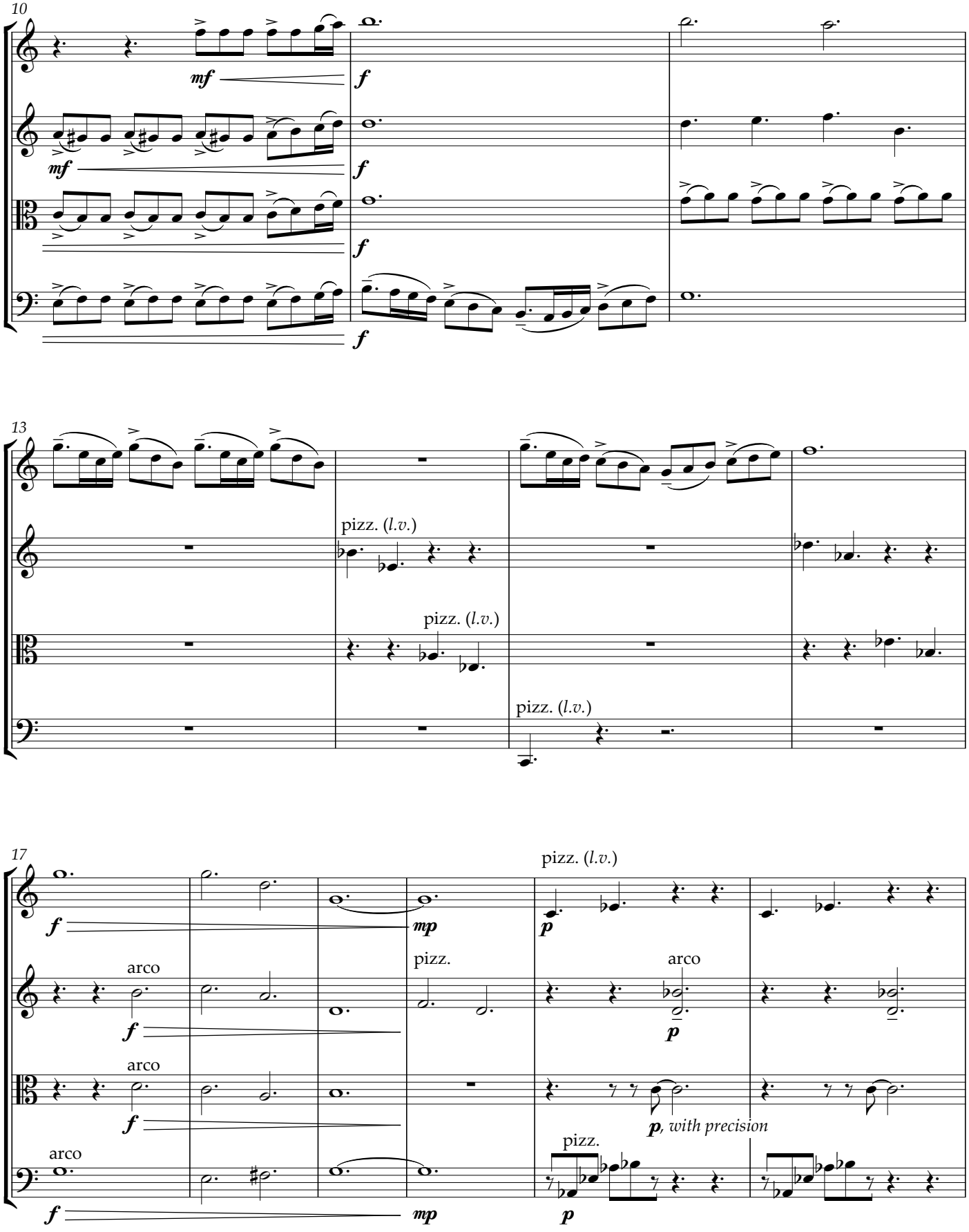

17
p
p
p
mf
mp
25
32
arco
pp
arco
pp

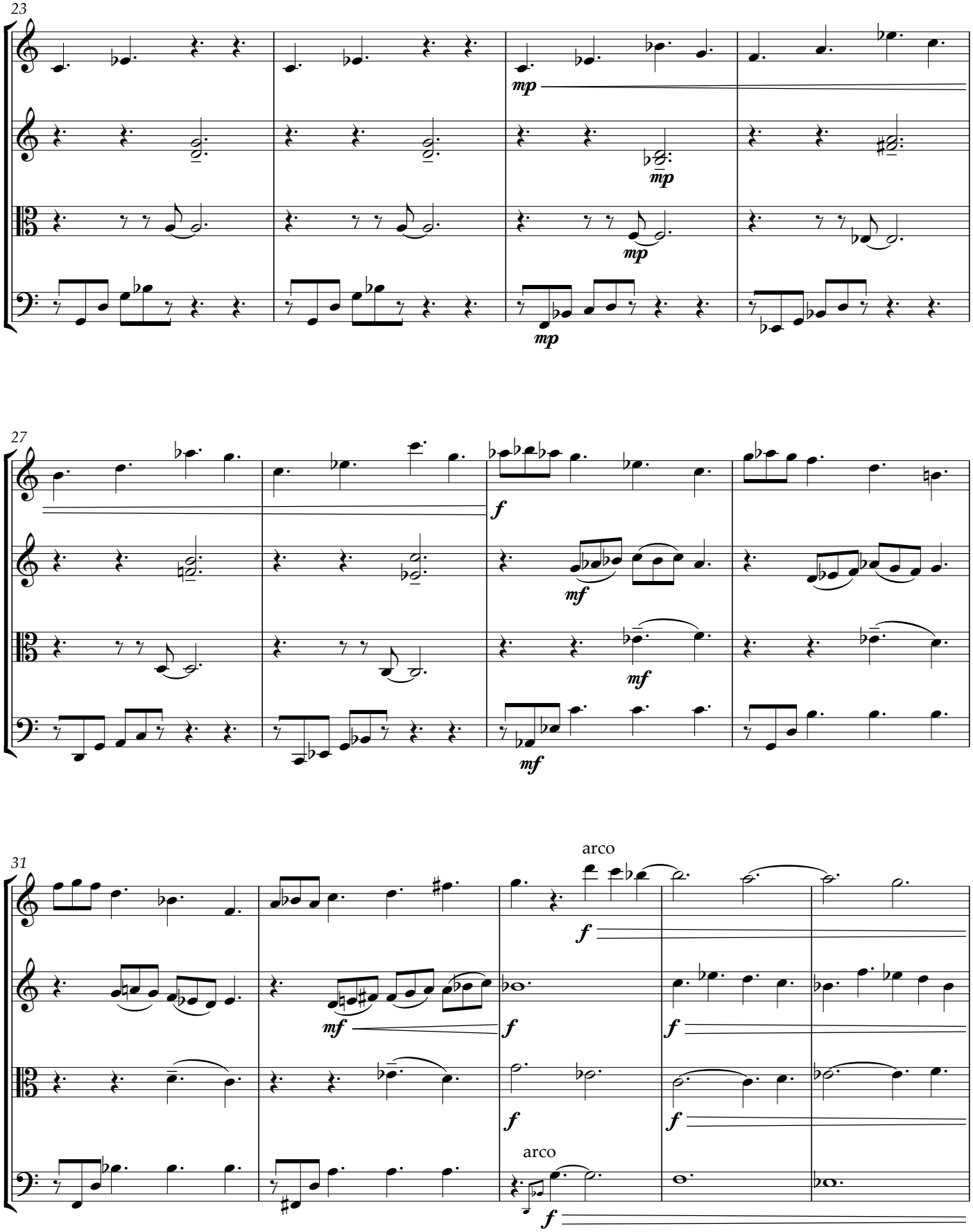

39
p
p
f
mf
47
p
pp
ppp
p
pp
f
mf
p
mf
mp
pp
mp
55
pp
pp
mp
mp
p
p

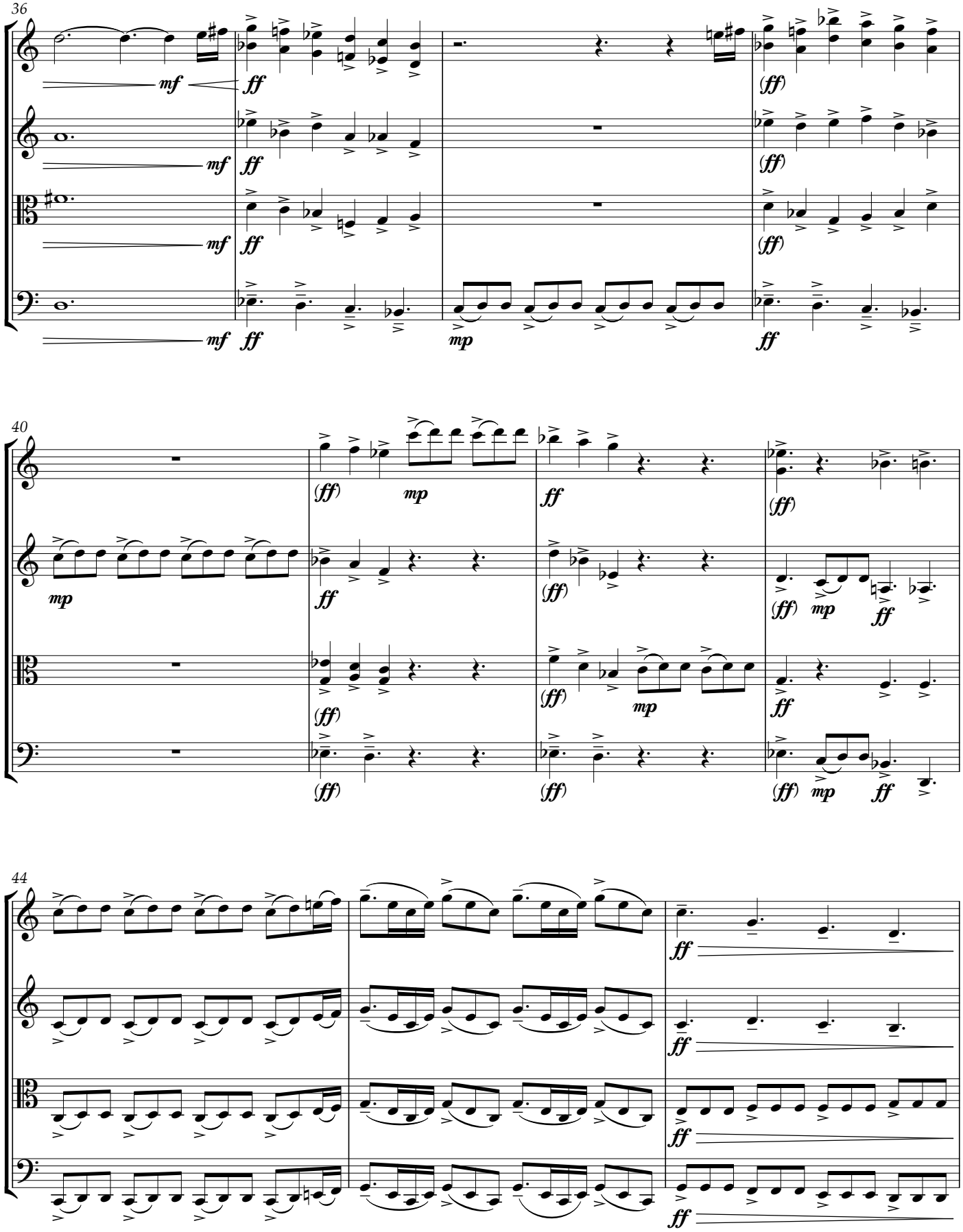

62
pizz.
mp
pizz.
mp
f
mf
70
77
pizz.
pizz.

+1

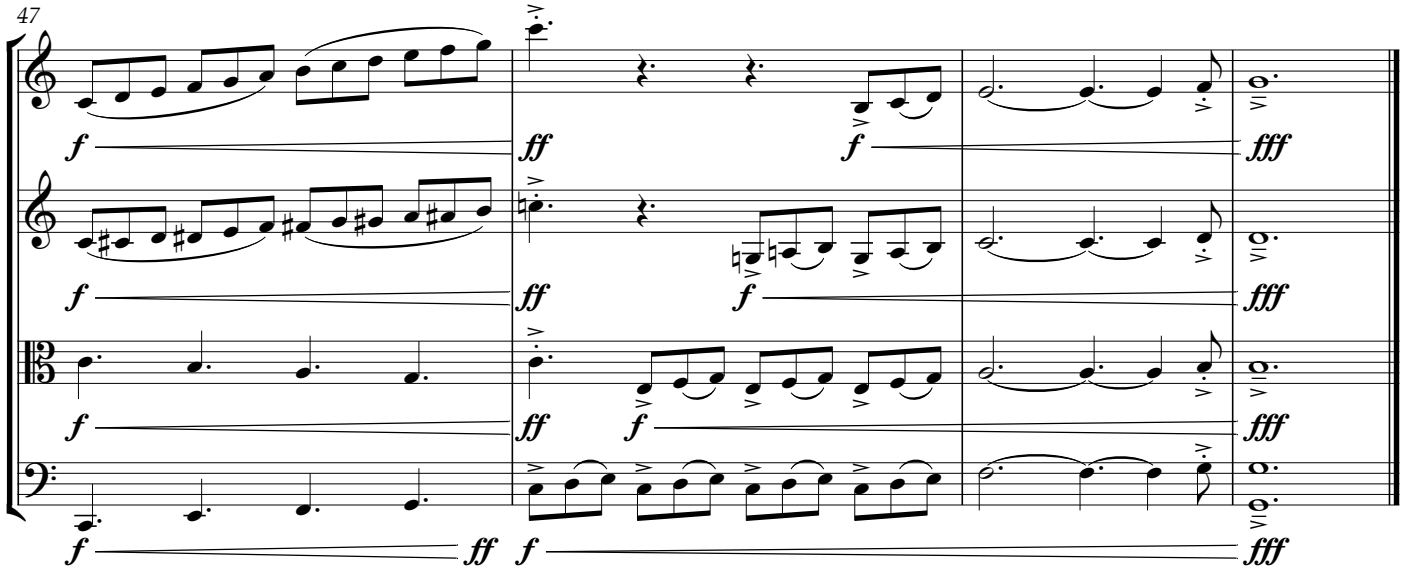



10
mf
f
13
pizz. (l.v.)
17
mp
p
arco
pizz.
p, with precision

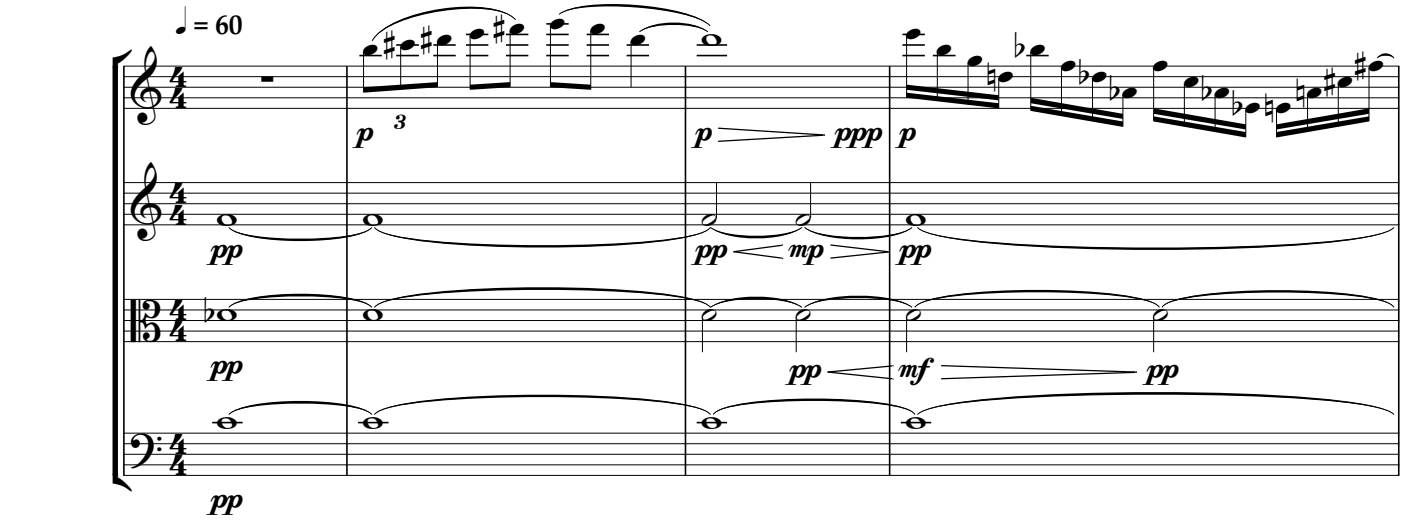

23
mp
mp
mp
27
f
mf
mf
mf
31
arco
f
mf
f
f
f
f
arco
f


36
40
44

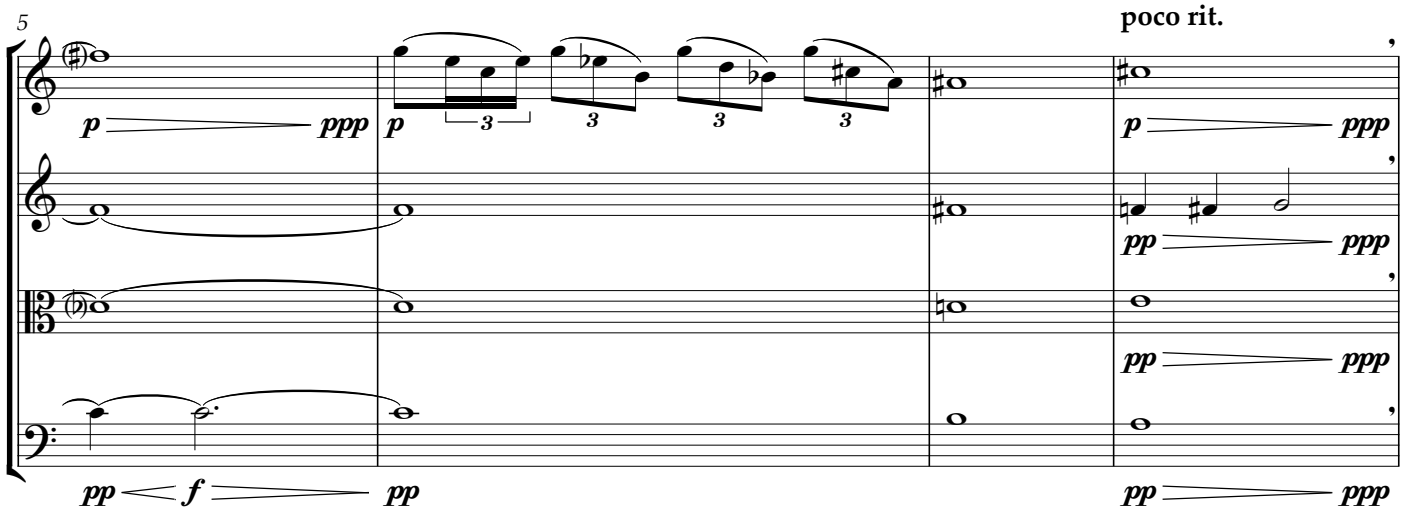
47

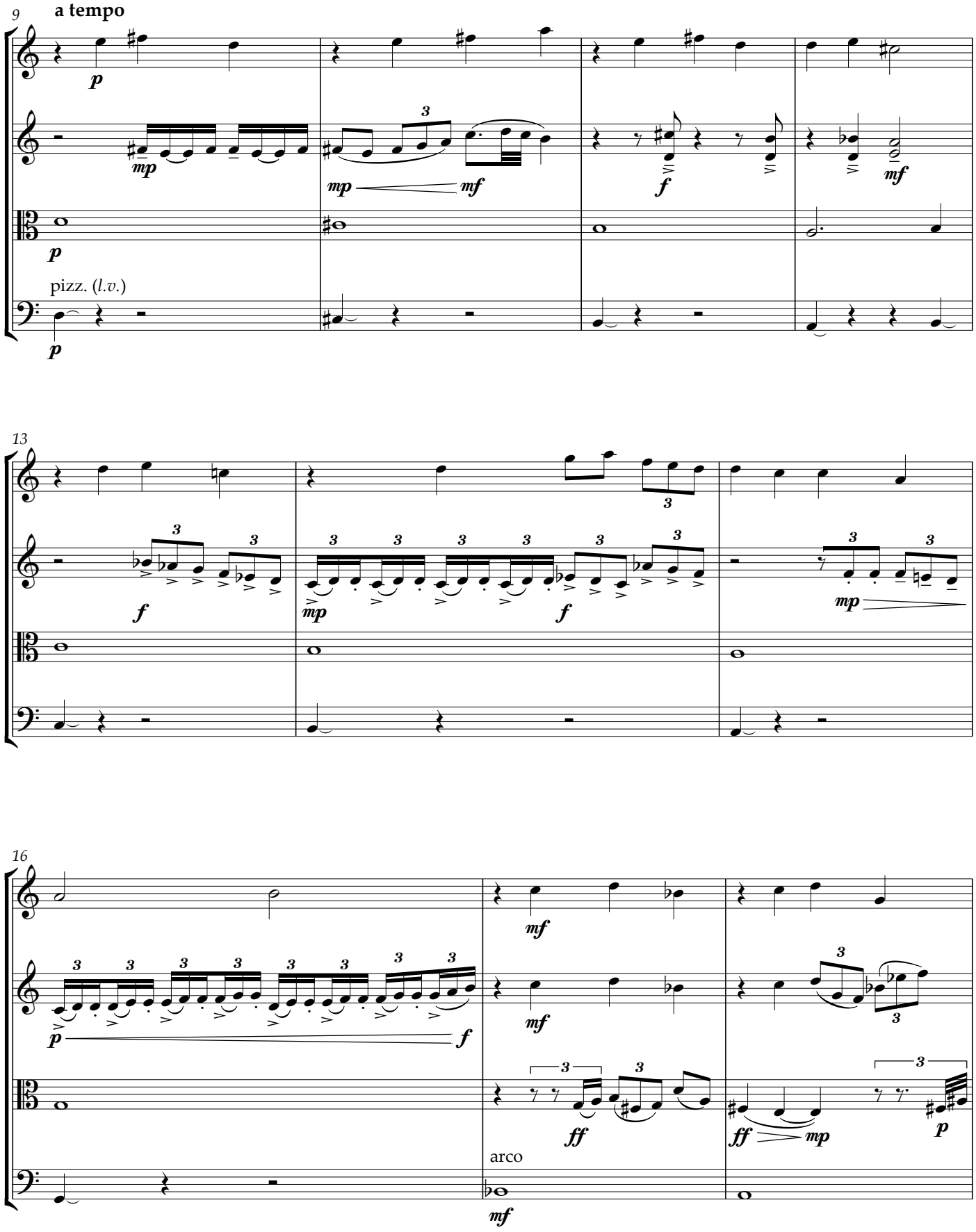


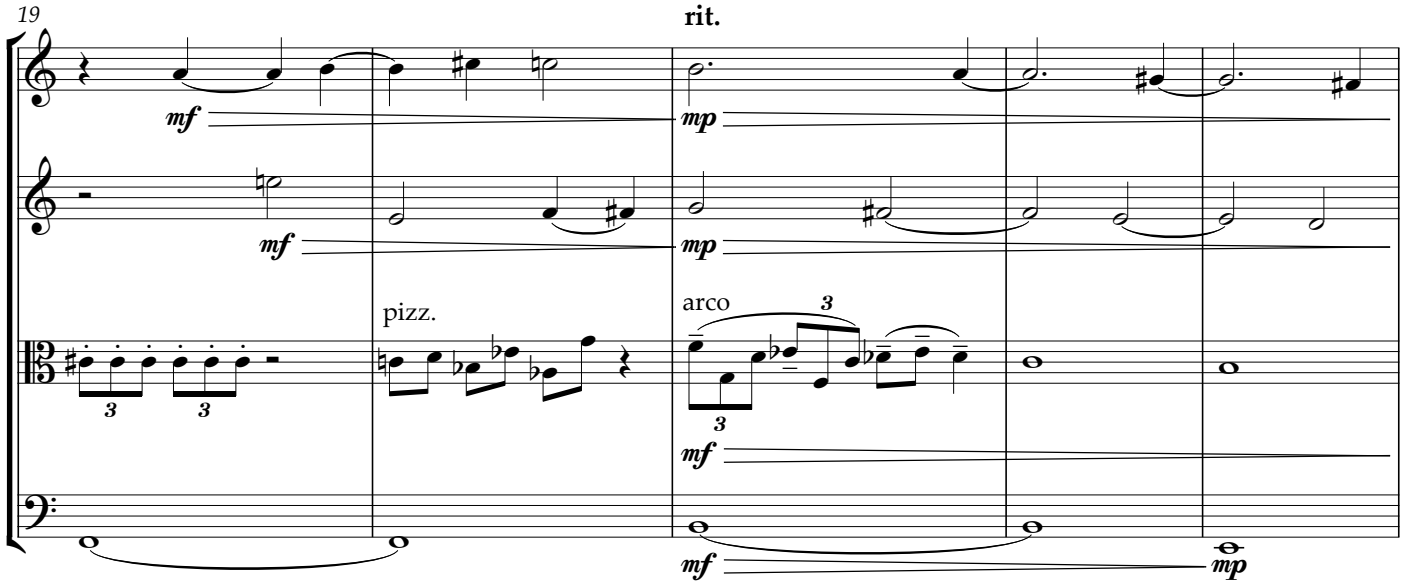
= 0

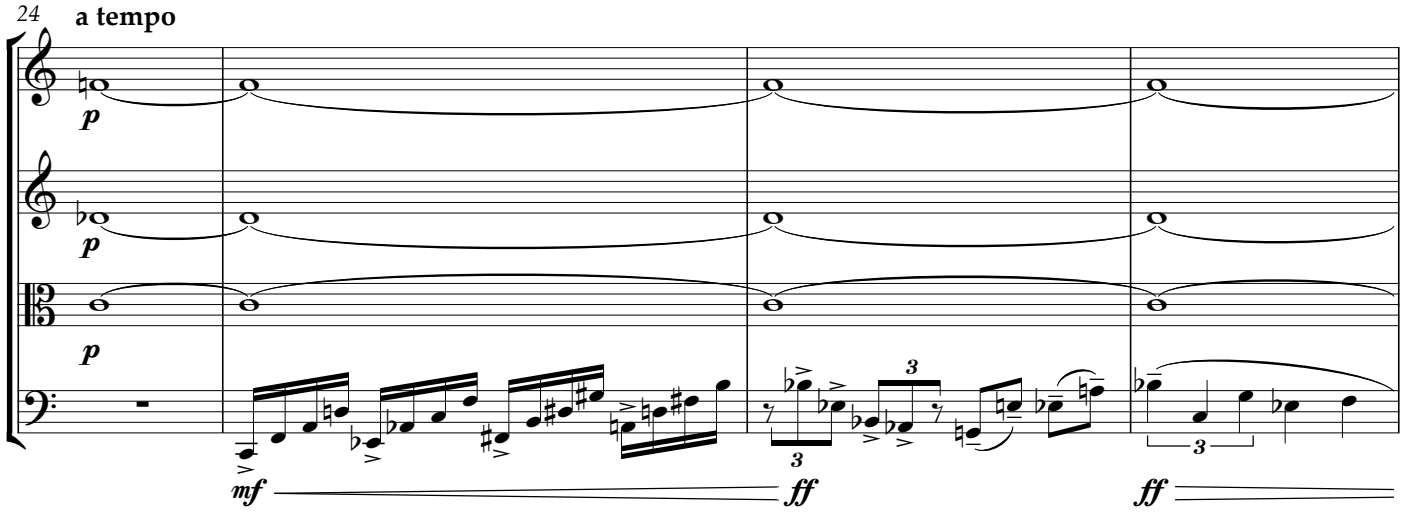


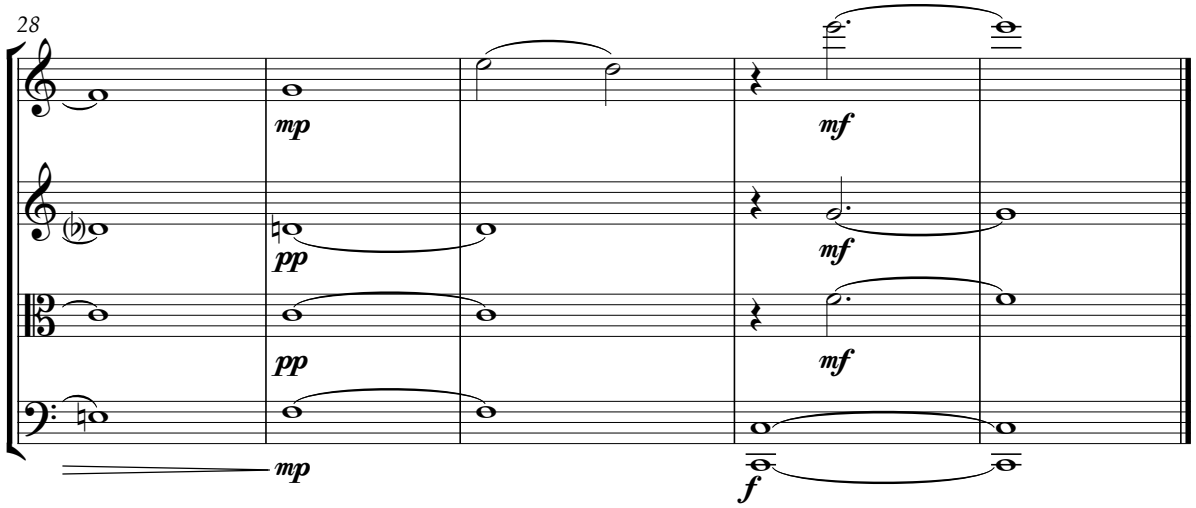
5




9
a tempo
pizz. (l.v.)
arco







Worcester, MA
October 2009