

Handout - Calculating Interval Ratios

Today the frequency of a sound is measured in Hertz. Hertz is an extremely precise unit of measurement for frequency, and a difference of even 1-2 hertz between frequencies is barely perceivable by the human ear.

Because of the precision of the measurement, calculating ratios between intervals sometimes result in irrational numbers, which cannot be written as a simplified fraction. Therefore, in order to find the "interval ratio" of each note pairing, divide the two notes, round using the specified rounding rules below, then convert back to a simplified ratio.

Examples of the different rounding methods you will use are given below:

Rounding Rule 1: Do not round

$$\frac{45}{180} = 0.25 = \underline{\hspace{2cm}}$$

Rounding Rule 2: Round to the nearest 10ths place

$$\frac{331.2}{562.1} = 0.\underline{5}892190 = \underline{\hspace{2cm}}$$

Rounding Rule 3: Round to the nearest 100ths

$$\frac{664.5}{886.7} = 0.74\underline{9}4079 = \underline{\hspace{2cm}}$$

Rounding Rule 4: Truncate at the 1000ths place and treat like a repeating decimal

$$\frac{261.63}{294.33} = 0.888\underline{8}700 = \underline{\hspace{2cm}}$$

Converting the New Decimal Back into a Fraction

1. When working with a terminating decimal, read the fraction aloud, write the fraction as you hear it, then reduce the fraction to its simplest form:

$$0.25 = \text{“twenty-five hundredths”} = \underline{\hspace{2cm}}$$

2. When working with a repeating decimal, the number can't simply be read aloud to find the fractional equivalent. Instead follow these steps:

a. Eliminate the repeating numbers by multiplying by 10

$$10 * 0.\overline{7771} = \underline{\hspace{2cm}}$$

b. Subtracting the original repeating decimal

$$7.\overline{777} - 0.\overline{777} = \underline{\hspace{2cm}}$$

c. From step a, it is known that when the repeating decimal is subtracted from 10 times itself, the result is 7. This information can be used to find the fractional equivalent of the decimal by writing an algebraic equation where x represents the unknown fraction:

Complete the table by following the direction below:

- In the “Compliment” column of Handout - Calculating the Pythagorean Scale, write the frequency for each note that you found on the “Pythagorean C Scale Frequencies” table.
- Write the ratio of the root note C to each of its compliments in fraction form.
- Find the simplified equivalent interval ratio for each.
- Use the space on the following pages as your guide. Show all of your work.

C Scale Interval Ratios

Root Note	Compliment	Exact Ratio	Interval Ratio
C 261.63 Hz	D 294.33 Hz		
C 261.63 Hz	E		
C 261.63 Hz	F		
C 261.63 Hz	G		
C 261.63 Hz	A		
C 261.63 Hz	B		
C 261.63 Hz	C		

Algebra Featuring Mickey Hart

C Scale Interval Ratio Calculations Work Space

C:D

Rounding Rule: Truncate at the 1000ths place and treat like a repeating decimal

Step 1: Convert the fraction to a decimal

Step 2: Follow the rounding rule

Step 3: Turn the decimal back into a fraction

Step 4: Write the fraction in simplest form

C:E

Rounding Rule: Round to the nearest 10ths

Step 1: Convert the fraction to a decimal

Step 2: Follow the rounding rule

Step 3: Turn the decimal back into a fraction

Step 4: Write the fraction in simplest form

Interval Calculations Work Space

C:F

Rounding Rule: Do not round

Step 1: Convert the fraction to a decimal

Step 2: Follow the rounding rule

Step 3: Turn the decimal back into a fraction

Step 4: Write the fraction in simplest form

C:G

Rounding Rule: Truncate at the 1000ths place and treat like a repeating decimal

Step 1: Convert the fraction to a decimal

Step 2: Follow the rounding rule

Step 3: Turn the decimal back into a fraction

Step 4: Write the fraction in simplest form

Interval Calculations Work Space

C:A

Rounding Rule: Round to the nearest 10ths

Step 1: Convert the fraction to a decimal

Step 2: Follow the rounding rule

Step 3: Turn the decimal back into a fraction

Step 4: Write the fraction in simplest form

C:B

Rounding Rule: Round to the nearest 100ths

Step 1: Convert the fraction to a decimal

Step 2: Follow the rounding rule

Step 3: Turn the decimal back into a fraction

Step 4: Write the fraction in simplest form

Interval Calculations Work Space

C:C

Rounding Rule: Do not round

Step 1: Convert the fraction to a decimal

Step 2: Follow the rounding rule

Step 3: Turn the decimal back into a fraction

Step 4: Write the fraction in simplest form