

Investigation 1- Fractions

Fractions show:

- A part of a whole: $\frac{1}{2} = 1$ part out of 2
- A ratio: $\frac{1}{2} = 1$ to 2 or 1:2
- Division: $\frac{1}{2} = 1 \div 2$

Denominator

- The number below the line in a fraction
- The total number of equal sized parts that the whole has been split into
- The larger the denominator the smaller the parts

Numerator

- The number above the line in a fraction
- The number of equal sized parts you have

Example: $\frac{3}{4}$

- 4 is the denominator (the whole is split into 4 equal sized parts)
- 3 is the numerator (you have 3 out of the 4 parts)



2.1 / 2.2 – EQUIVALENT FRACTIONS

Equivalent Fractions: fractions that represent the same amount even though their numerators and denominators are different

$$\frac{2}{3} = \frac{4}{6}$$



Find equivalent fractions by.....

Multiplying the numerator and the denominator by the same number

$$\frac{6}{7} \times 3 = \frac{18}{21} \quad \times 3 \text{ is the scale factor}$$

Or

Dividing the numerator and the denominator by the same number. If you divide by the GCF the fraction will be in simplest form.

$$\frac{10}{15} \div 5 = \frac{2}{3} \quad \div 5 \text{ is the scale factor}$$

Use equivalent fractions to find fractions between fractions or to compare fractions.

2.3 – Comparing Fractions

Strategies:

- Use benchmarks by seeing if fractions are more or less than a half or very close to zero or a whole.
- If the denominators are the same, compare the numerators.

$$\frac{5}{8} < \frac{6}{8}$$

Since both fractions have equal sized pieces, having 5 of them is less than having 6 of them

- If the numerators are the same, compare the denominators (remember the smaller the denominator the larger the piece)

$$\frac{5}{6} > \frac{5}{8}$$

Since both fractions have the same amount of pieces, you will have more with 6ths because they are larger than 8ths

- If denominators are different make equivalent fractions using the same denominators

$$\frac{18}{36} = \frac{3 \times 6}{3 \times 12} < \frac{5 \times 4}{9 \times 4} = \frac{20}{36}$$

12 and 9 share 36 as a common multiple, so make both fractions have the denominator of 36

- The product of the means equals the product of the extremes

$$65 \quad \frac{13}{12} < \frac{6}{5} \quad 72$$

Multiply the numerator of one fraction by the denominator of the other. $13 \times 5 = 65$. $6 \times 12 = 72$.
This works because you are really just creating equivalent fractions with the same denominator. You get your denominator by multiplying both denominators together.

2.4 Fractions between Fractions

YOU CAN ALWAYS FIND A FRACTION BETWEEN ANY TWO FRACTIONS

Find a common denominator for both fractions and then make equivalent fractions using that denominator.

Fractions that fall between $\frac{3}{10}$ and $\frac{7}{10}$ are...
the obvious ones... $\frac{4}{10}$, $\frac{5}{10}$, $\frac{6}{10}$

also... $\frac{7}{20}$, $\frac{8}{20}$, $\frac{9}{20}$, $\frac{10}{20}$, $\frac{11}{20}$, $\frac{12}{20}$, $\frac{13}{20}$
because $\frac{3}{10} = \frac{6}{20}$ and $\frac{7}{10} = \frac{14}{20}$

Fractions that fall between $\frac{1}{5}$ and $\frac{2}{5}$ are...

$\frac{3}{10}$

Because $\frac{1}{5} = \frac{2}{10}$ and $\frac{2}{5} = \frac{4}{10}$

Also... $\frac{5}{20}$, $\frac{6}{20}$, $\frac{7}{20}$

Because $\frac{1}{5} = \frac{4}{20}$ and $\frac{2}{5} = \frac{8}{20}$

3.4 Changing Fractions to Decimals

1. If the denominator is compatible, make an equivalent fraction with a denominator that is a power of 10 (10, 100, 1000, 10,000...). Then read the fraction.

$$\frac{11}{20} \times 5 = \frac{55}{100} = 0.55$$

Or

2. Divide the numerator by the denominator (works every time)

- You may get a
 - Terminating decimal: the decimal ends,

$$\frac{2}{5} \quad 2 \div 5 = 0.4$$

$$\begin{array}{r} 4 \\ 5 \overline{) 2.0} \\ \underline{-20} \\ 0 \end{array}$$

Move decimal straight up. If you are left with a remainder, annex a zero in the dividend and continue to divide.

- Repeating decimal: goes on forever

$$\frac{1}{3} \quad 1 \div 3 = 0.333333... = 0.\overline{3}$$

$$\begin{array}{r} 33 \\ 3 \overline{) 1.00} \\ \underline{-9} \\ 10 \\ \underline{-9} \\ 1 \end{array}$$

Use bar notation to denote a repeating pattern.

$$0.22222... = 0.\overline{2} \quad 0.166666... = 0.1\overline{6} \quad 0.525252... = 0.5\overline{2}$$

2.5 Mixed Numbers and Improper Fractions

Mixed Number – A whole number and a fraction

Example: $2 \frac{1}{2}$

Improper Fraction – the numerator is greater than or equal to the denominator

Example: $\frac{12}{5}$

Changing from a mixed number to an improper fraction

Get your numerator by multiplying the denominator by the whole number and then adding on the numerator. Keep the denominator the same.

$$2\frac{1}{2} = \frac{5}{2}$$

Changing from an improper fraction to a mixed number

Numerator \div Denominator

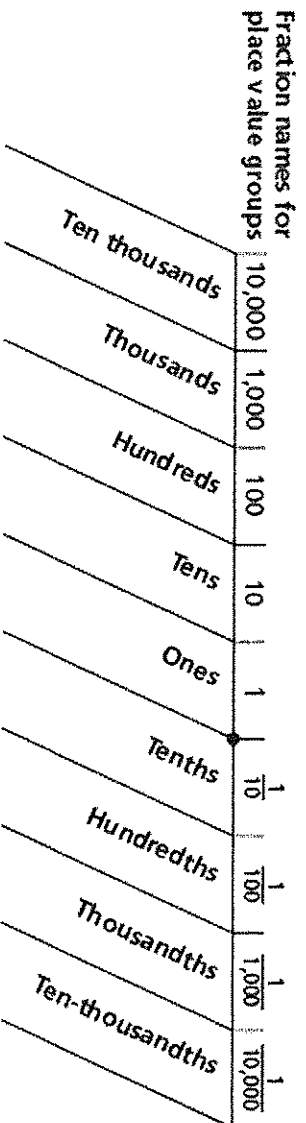
$d \overline{)n}$

$$\frac{12}{5} = 12 \div 5$$

$$\begin{array}{r} \leftarrow \text{whole \#} \\ 5 \overline{)12} = 2\frac{2}{5} \\ \underline{-10} \\ 2 \leftarrow \text{numerator} \end{array}$$

3.1/3.2 - DECIMALS

Decimal names for place value groups 10,000 1,000 100 10 1 0.1 0.01 0.001 0.0001



Reading decimals:

- 1) Read the whole number.
- 2) Read the decimal point as "and"
- 3) Read the number after the decimal point
- 4) Say the place value the number ends in

Example: 2.034 = two and thirty-four thousandths

Writing decimals as fractions:

- 1) Write the whole number
- 2) Write the number after the decimal as the numerator
- 3) Write the place value as the denominator

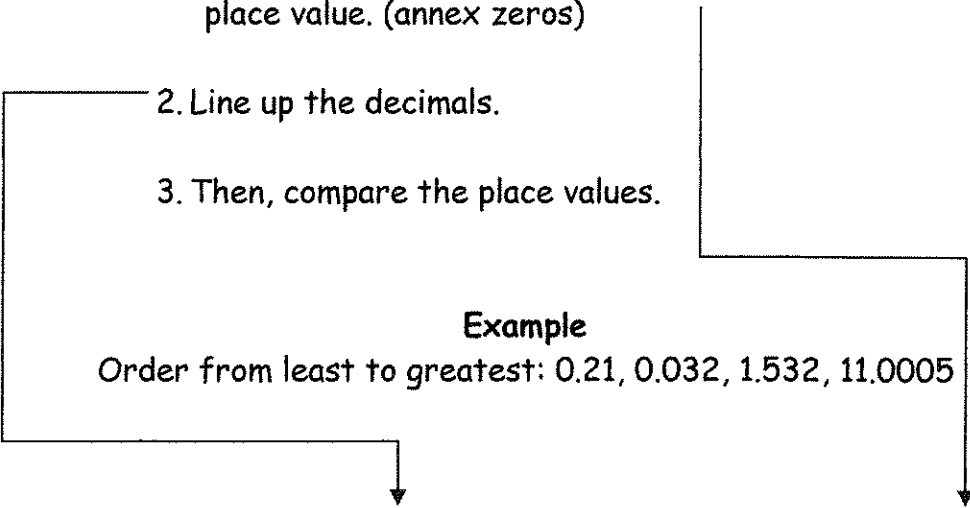
Example: 2.034 = $2 \frac{34}{1000}$

3.5 Comparing/Ordering Decimals

1. Rewrite all decimals so that they end in the same place value. (annex zeros)
2. Line up the decimals.
3. Then, compare the place values.

Example

Order from least to greatest: 0.21, 0.032, 1.532, 11.0005



	0	.	2	1	0	0
	0	.	0	3	2	0
	1	.	5	3	2	0
1	1	.	0	0	0	5

In this example, I annexed zeros so that all four numbers ended in the ten-thousandths place.

After I lined up the decimals I looked at the place values.

Least to greatest:

0.032
0.21
1.532
11.0005

INVESTIGATION 4 – PERCENTS

Percent – Means “out of 100”

<p style="text-align: center;"><u>Percent to Decimal</u></p> <p style="text-align: center;">Divide by 100 (move decimal 2 places left)</p> <p style="text-align: center;">$22\% = 0.22$ because $22 \div 100 = 0.22$</p>	<p style="text-align: center;"><u>Percent to Fraction</u></p> <p style="text-align: center;">The percent is the numerator and the denominator is 100 Then simplify.</p> <p style="text-align: center;">$45\% = \frac{45}{100} = \frac{9}{20}$</p>
<p style="text-align: center;"><u>Decimal to Percent</u></p> <p style="text-align: center;">Multiply by 100 (move decimal 2 places right)</p> <p style="text-align: center;">$0.05 = 5\%$ Because $0.05 \times 100 = 5$</p>	<p style="text-align: center;"><u>Fraction to Percent</u></p> <p style="text-align: center;">Change fraction to a decimal. Change decimal to percent.</p> <p style="text-align: center;">$\frac{4}{5} = 4 \div 5 = 0.8$</p> <div style="text-align: center;"> $\begin{array}{r} 5 \overline{)4.0} \\ \underline{40} \\ 0 \end{array}$ </div> <p style="text-align: center;">$0.8 \times 100 = 80\%$</p>