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3.1 Fractions to Decimals

Non-integer numbers can be written as fraction or decimals.

Fractions: $\frac{2}{5}$ ← numerator, ← denominator

Decimals: 0.625 ← thousandth; tenth, hundredth

Fraction	$\frac{7}{10}$ seven tenths	$\frac{1}{100}$	$\frac{19}{100}$	$\frac{1}{1000}$	$\frac{23}{1000}$
Decimal	0.7	0.01	0.19	0.001	0.023

seven in the tenth spot

end in the thousandth place

Example: Write each fraction as a decimal.

Strategy #1 – Change the fraction so that the denominator is 10, 100, 1000 etc.

$\frac{3}{5} \overset{\times 2}{=} \frac{6}{10} = 0.6$ (5 ×2→ 10)

*must do same to top & bottom

$\frac{6}{25} \overset{\times 4}{=} \frac{24}{100} = 0.24$ (25 ×4→ 100)

Strategy #2 – Divide using long division.

$\frac{3}{8}$

$8\overline{)3.0000}$ = 0.375

−24

60

−56

40

−40

0

↳ when you can't easily change the fraction

$\frac{3}{8} = 0.375$

Example: Write each decimal as a fraction. Reduce to lowest terms. ← simplify

0.73

$\frac{73}{100}$

↑ can't reduce – no common factors

0.12

$\frac{12 \div 4}{100 \div 4} = \frac{3}{25}$

HW p. 88 #1, 2, 3a, 4,

Bonus 5, 6, 8, 9, 10

extension

Decimals such as 0.1 and 0.25, are terminating decimals.

Decimals such as 0.333 333... or 0.454 545...; 0.811 111... are repeating decimals.

Some digits in each repeating decimal repeat forever. We draw a bar over the digits that repeat.

Example: $0.\overline{3}$ $0.\overline{45}$ $0.8\overline{1}$

Use a calculator to divide the following:

5 ÷ 9 $= 0.5$

38 ÷ 99 $0.\overline{38}$

13 ÷ 999 $0.\overline{013}$

What pattern do you see?

# of repeating digits = the # of 9's in the denominator

Example: Write the following repeating decimals as fractions.

$0.\overline{2} = \frac{2}{9}$

$0.\overline{875} = \frac{875}{999}$

$0.\overline{03} = \frac{3}{99}$

Mixed fraction

Improper fraction

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3.2 Comparing and Ordering Fractions and Decimals

Question: Three students are selling chocolate bars as a fund raiser for their school. The bars are packaged in cartons. Ardavan sold $2\frac{2}{3}$ cartons, Isha sold $\frac{5}{2}$ cartons and Daniel sold 2.25 cartons.

Who sold the most chocolate bars? How do you know?

Ardavan

$2\frac{2}{3}$

Isha

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

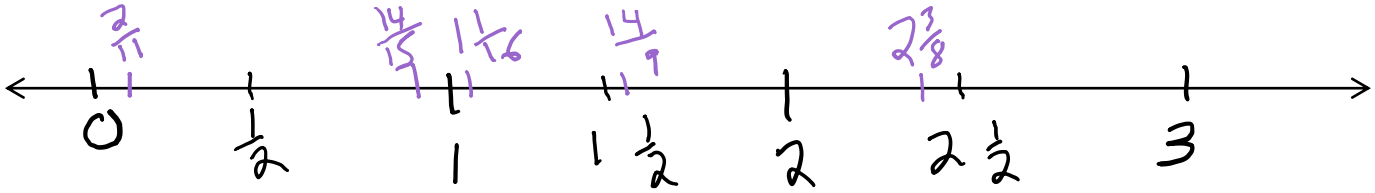
Daniel

$2.25 = 2\frac{25}{100} = 2\frac{1}{4}$

Any fraction greater than 1 can be written as a mixed number.

Use a number line to order the following numbers: $\frac{2}{11}, 2\frac{3}{8}, 1\frac{1}{16}, \frac{14}{9}, \frac{14}{15}$

$1\frac{5}{9}$



Example:

a) Write the following numbers in order from least to greatest: $\frac{7}{8}, \frac{9}{8}, \frac{1}{4}$, 0.75

same denominator

$\frac{1}{4} \times 2 = \frac{2}{8}$

$0.75 = \frac{75 \div 25}{100 \div 25} = \frac{3}{4} \times 2 = \frac{6}{8}$

$\frac{2}{8}, \frac{6}{8}, \frac{7}{8}, \frac{9}{8}$

$\frac{1}{4}, 0.75, \frac{7}{8}, \frac{9}{8}$

b) Write a number between $\frac{9}{8}$ and $1\frac{1}{4}$.

$1\frac{1}{4} = \frac{5}{4}$

$\frac{9}{8}$ $\frac{5}{4} \times 2$

$\frac{9}{8} \times 2$ $\frac{10}{8} \times 2$

$\frac{18}{16}$ $\frac{19}{16}$ $\frac{20}{16}$

HW: p. 94

1, 3ac, 4ac, 5a, 6, 7, 8a.c, 9a, 10, 11

2 days

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3.3 Adding and Subtracting Decimals

The Hunger Games: Mockingjay just set box office records for an opening 5 days in November. The earnings are shown in the table.

Estimate the total box office earnings.

70.95 → 71
52.6 → 53
34.53 → 35
12.3 → 12
15.9 → 16

$$\begin{array}{r} {\scriptstyle 1} \\ 71 \\ 53 \\ 35 \\ 12 \\ 16 \\ \hline 187 \end{array}$$

Day	Earnings (Millions of $)
Friday	70.95
Saturday	52.6
Sunday	34.53
Monday	12.3
Tuesday	15.9

Tips on Rounding:
- Find the place that you want to round
- Look at the digit to the right
- If it is 0 – 4 round down
- If it is 5 – 9 round up

When adding or subtracting decimal we will always estimate the answer first.

Determine the exact box office earnings.

$$\begin{array}{r} {\scriptstyle 1\ 3} \\ 70.95 \\ 52.60 \\ 34.53 \\ 12.30 \\ 15.90 \\ \hline 186.28 \end{array}$$

$186.28

How much more money did the movie make on Friday than it did on Saturday?

$$\begin{array}{r} {\scriptstyle 6\ 1} \\ \cancel{7}0.95 \\ -52.60 \\ \hline 18.35 \end{array}$$

$18.35

Homework: p.98 # 1-6, 9,10

Estimate the following:

1) 13.7 + 9.15
14 + 9
= 23

2) 14.63 + 122.1
15 + 122
122
+15
137

3) 48.3 - 12.59
48 − 13
= 35

4) 263.94 – 32.87
264 − 33
264
−33
231

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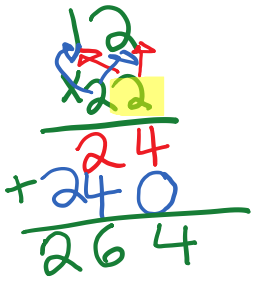
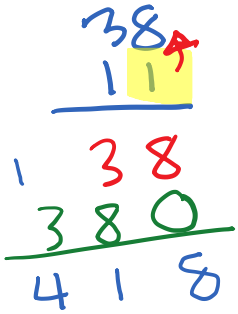
3.4 Multiplying Decimals

Calculate the following:

12 x 22



38 x 11



Estimate the following:

1.9 x 2.3

2 x 2 = 4

4.25 x 9.11

4 x 9 = 36

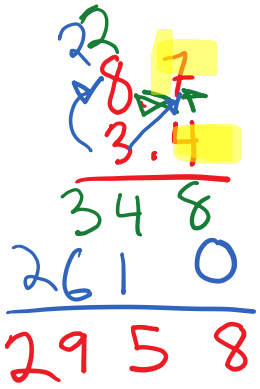
12.2195 x 8.5903

12 x 9 = 108 only care about # next to column we want to round to

We can solve decimal multiplication by estimating and then calculating

Ex: 8.7 x 3.4

9 x 3 = 27

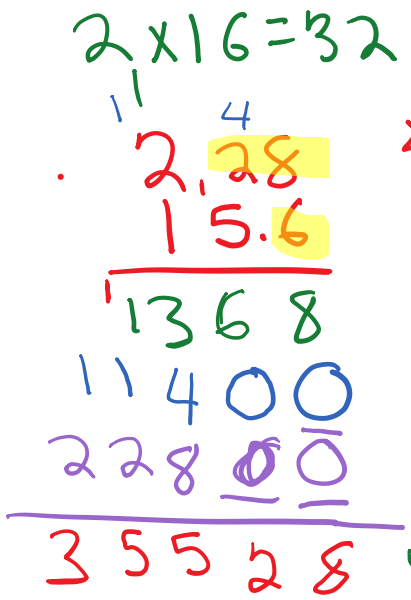


29.58

use estimate to help place decimal

2) 2.28 x 15.6

2 x 16 = 32



don't need decimal places to line up

35568

where to put decimal that is close to 32?

Homework: p. 102 # 8- 13

To determine where to place the decimal point in our answer we can do the following:

- Look at our original numbers

Count the number of digits after the decimal place in the original number and then make sure that there are the same total number of digits

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3.5 Dividing by Decimals

Ex. 52.1 ÷ 0.8

Use a calculator to find the following:

1) 52.1 ÷ 10 2) 52.1 ÷ 50 3) 52.1 ÷100

When we divide by a number greater than one the dividend gets _____.

Use a calculator to find the following:

1) 52.1 ÷ 0.1 2) 52.1 ÷ 0.05 3) 52.1 ÷ 0.01

When we divide by a number less than one the dividend gets _____.

Homework: p. 106 # 2-10 Bonus 11-13

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3.6 Order of Operations

- When solving equations with multiple operations we go _____ _____ _____ ___ _____
- Remember that we need to solve it in the correct order: _____

Ex: Solve $12.376 \div (4.75 + 1.2) + 2.45 \times 0.2 - 1.84$

B
E
D
M
A
S

Homework: p. 109 # 1-6

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3.7 Relating Fractions, Decimals and Percents

Percentages are another way to write _____ and _____.

Ex: 12% 85%

En Francais:

Hundred = _____

So **percent** literally translates to:

Write the following as fractions and decimals:

a) 75% b) 8% c) 157%

Strategy for converting percentages:

- Write the number over _____
-

Write the following as percentages:

a) 0.18 b) 0.7 c) $\frac{7}{25}$ d) $\frac{21}{35}$

Strategy for converting to percentage

- Write as a fraction with a denominator of _____.
- If you are stuck _____ the fraction first.

Homework: p.112 # 1-5

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3.8 Solving Percentage Problems

Ex: A jacket costs $48 and is on sale for 30% off.

a. How much would you save?

b. What is the final cost of the jacket?

Estimate

Ex: A book costs $9 and there is an 8% sales tax. What is the final sale price?

Estimate

Homework: p. 115 # 1-7