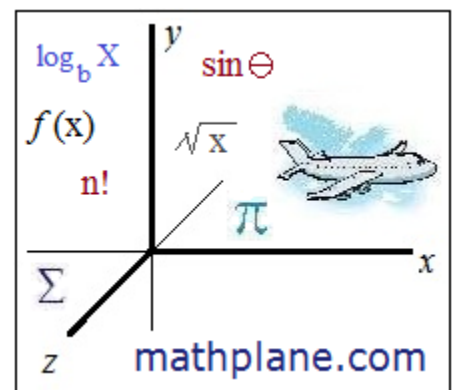


Decimals

Notes, examples, practice exercise and puzzle



Decimals: Using Simple Math Operations

The most common number system is the decimal numeral system (that has ten as its base). Every position of a number represents powers of ten.

→ Moving the decimal place one space to the right, multiplies the number by 10.
And, moving the decimal to the left divides the number by 10.

→ Zeroes at the end are optional
 $3.406 = 3.406000$

$$25\% \rightarrow \frac{25}{100} \rightarrow .25$$

$$6\% \rightarrow \frac{6}{100} \rightarrow .06$$

Addition/Subtraction:

"Line up decimals"
("Add Zeros")
Solve

$$3.4 + 72.66 =$$

$$\begin{array}{r} 72.66 \\ + 3.40 \\ \hline 76.06 \end{array}$$

$$53.44 - 37.0101 =$$

$$\begin{array}{r} 53.4400 \\ - 37.0101 \\ \hline 16.4299 \end{array}$$

Multiplication:

Multiply
"Find total decimal places of factors"
"Move decimal point to the left"

$$3.45 \times 9.06 =$$

$$\begin{array}{r} 3.45 \quad (2 \text{ places}) \\ \times 9.06 \quad (2 \text{ places}) \\ \hline 31,2570, \\ \hline \end{array}$$

(move decimal 4 places)

$$2.6 \times .0041 =$$

$$\begin{array}{r} .0041 \quad (4 \text{ places}) \\ \times 2.6 \quad (1 \text{ place}) \\ \hline 0246 \\ + 00820 \\ \hline .01066, \\ \hline \end{array}$$

(move decimal 5 places)

Division:

Method 1:

- Divide
- Check answer
- Add decimal to finalize answer

Method 2:

- "Line up decimals"
- "Move decimals out"
- Solve
(Check Answer)

$$\textcircled{1} 22.4 \div .02 =$$

$$224 \div 2 = 112$$

$$\begin{array}{r} 112 \\ \times .02 \\ \hline 2.24 \end{array}$$

We need 22.4, so we multiply by 10
(move decimal one place to the right)

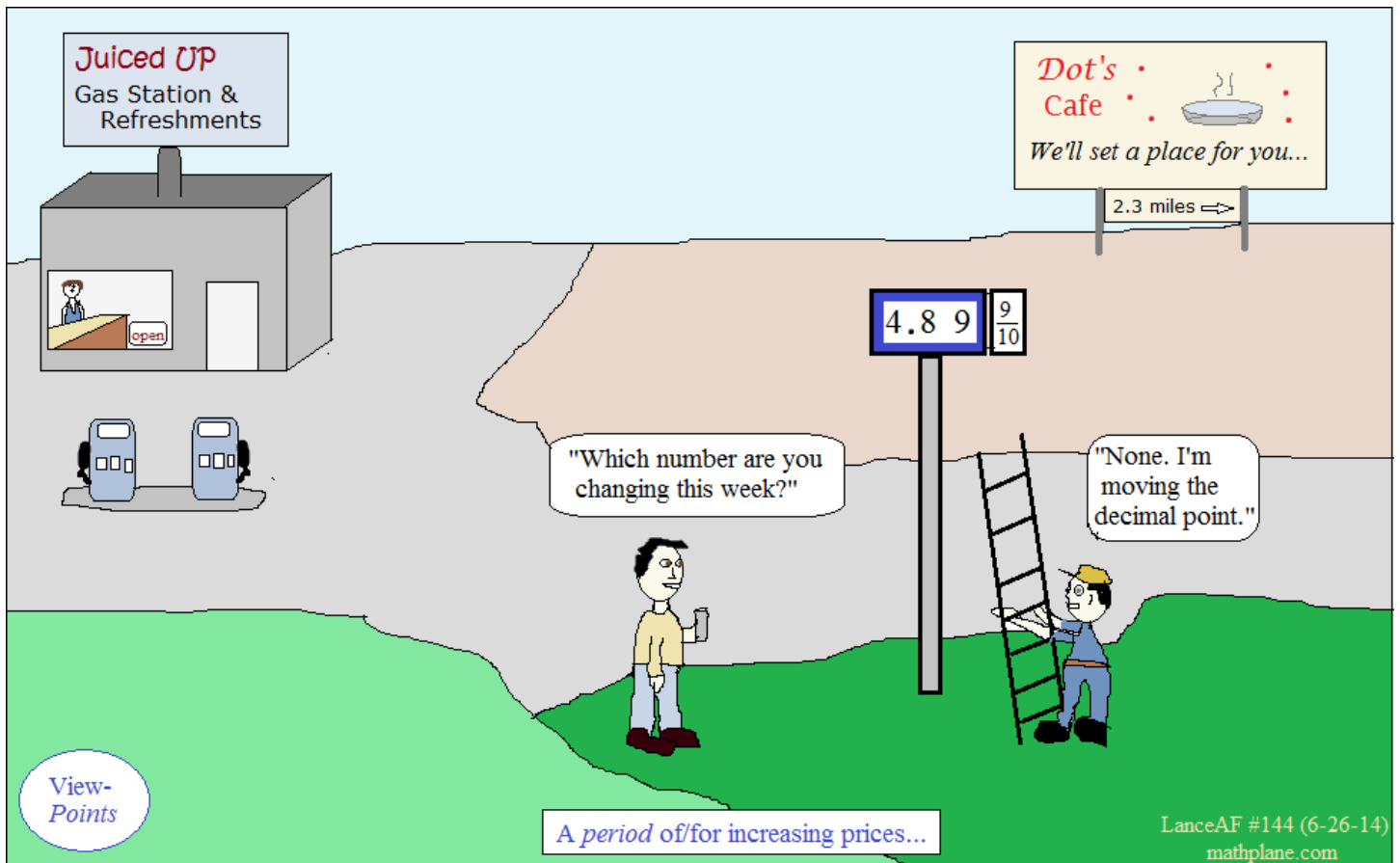
$$\textcircled{2} 1.47 \div .7 =$$

$$0.70 \overline{)1.47} \quad (\text{each has 2 decimal places})$$

$$\begin{array}{r} 002.1 \\ 70 \overline{)147} \\ \underline{-140} \\ 7.0 \\ \underline{-7.0} \\ 0 \end{array}$$

(move decimals out and solve) 2.1

$$2.1 \times .7 = 1.47$$



Exercises →

Decimals Exercise

I. Addition

$$\begin{array}{r} .230 \\ + .781 \\ \hline \end{array}$$

$$\begin{array}{r} 25.33 \\ + 3.821 \\ \hline \end{array}$$

$$\begin{array}{r} 14.1 \\ + 0.234 \\ \hline \end{array}$$

$$\begin{array}{r} 718.34 \\ + 51.767 \\ \hline \end{array}$$

$23.23 + 4.626 =$

$20.023 + 2.66 =$

$.345 + 3.45 =$

II. Subtraction

$$\begin{array}{r} 552.4 \\ - 26.6 \\ \hline \end{array}$$

$$\begin{array}{r} 23.070 \\ - 1.249 \\ \hline \end{array}$$

$$\begin{array}{r} 1.246 \\ - .63 \\ \hline \end{array}$$

$$\begin{array}{r} 55.555 \\ - 5.5 \\ \hline \end{array}$$

$53.67 - 2.48 =$

$40.66 - 3.972 =$

$0.2444 - 0.02444 =$

Decimals Exercise

III. Multiplication

$$\begin{array}{r} 31.46 \\ \times \quad 2 \\ \hline \end{array}$$

$$\begin{array}{r} 22.3 \\ \times 10.4 \\ \hline \end{array}$$

$$\begin{array}{r} 1.002 \\ \times 33.23 \\ \hline \end{array}$$

$$\begin{array}{r} .0034 \\ \times .002 \\ \hline \end{array}$$

$34 \times .21 =$

$56 \times .302 =$

$34.56 \times 2.33 =$

IV. Division

$3 \overline{) 636.33}$

$.11 \overline{) 55}$

$.4 \overline{) 24.8}$

$.05 \overline{) 255}$

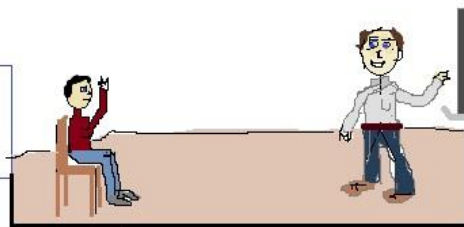
$45.65 \div 5 =$

$344 \div .02 =$

$.096 \div .8 =$

Hidden Message

Clue: "A question that a student may ask when learning about decimals?"



Letter Key:

0	1	2	3	4	5	6	7	8	9
A	E	H	I	N	O	P	S	T	W

Solve the following problems. Then, convert the numbers into letters to reveal the answer!

1) $2.7 + 27.27 =$

2) $.65 - .108 =$

3) $3.706 \div .1 =$

4) $12.3 + 4.56 =$

5) $0.7 - 0.07 =$

6) $\frac{35}{50} =$

7) $.14 \times .7 =$

8) $(3.6 \times 10^5) \times (2.7 \times 10^6) =$

9) $100 - .09 =$

10) $26.4 + 935.3 =$

11) $\frac{56}{99} =$

12) $.63 \div .21 =$

13) $\frac{1}{25} =$

14) $102.02 - 10.202 =$

29. 7 \rightarrow _____

.54 \rightarrow _____

37. 60 \rightarrow _____

16. 6 \rightarrow _____

.6 \rightarrow _____

\rightarrow _____

.09 \rightarrow _____

9.7 $\times 10^{11} \rightarrow$ _____

99.9 \rightarrow _____

9 1.7 \rightarrow _____

. $\overline{656} \rightarrow$ _____

\rightarrow _____

.0 \rightarrow _____

91. 18 \rightarrow _____

Decimals Exercise

Solutions

I. Addition

$$\begin{array}{r} \\ .230 \\ + .781 \\ \hline 1.011 \end{array}$$

$$\begin{array}{r} 25.33 \\ + 3.821 \\ \hline \end{array}$$

(align the decimals)

$$\begin{array}{r} 25.330 \\ + 3.821 \\ \hline 29.151 \end{array}$$

$$\begin{array}{r} 14.1 \\ + 0.234 \\ \hline \end{array}$$

(using zeros as place-holders)

$$\begin{array}{r} 14.100 \\ + 00.234 \\ \hline 14.334 \end{array}$$

$$\begin{array}{r} 718.340 \\ + 51.767 \\ \hline 770.107 \end{array}$$

$23.23 + 4.626 =$

$$\begin{array}{r} 23.23 \\ + 4.626 \\ \hline 27.856 \end{array}$$

$20.023 + 2.66 =$

$$\begin{array}{r} 20.023 \\ + 2.660 \\ \hline 22.683 \end{array}$$

$.345 + 3.45 =$

$$\begin{array}{r} 0.345 \\ + 3.450 \\ \hline 3.795 \end{array}$$

II. Subtraction

$$\begin{array}{r} \\ 552.4 \\ - 26.6 \\ \hline 525.8 \end{array}$$

$$\begin{array}{r} 23.070 \\ - 1.249 \\ \hline 21.821 \end{array}$$

$$\begin{array}{r} 1.246 \\ - .63 \\ \hline \end{array}$$

(align the decimals)

$$\begin{array}{r} 55.555 \\ - 5.5 \\ \hline \end{array}$$

(align decimals)

$$\begin{array}{r} 1.246 \\ - .630 \\ \hline 0.616 \end{array}$$

$$\begin{array}{r} 55.555 \\ - 5.500 \\ \hline 50.055 \end{array}$$

$53.67 - 2.48 =$

$$\begin{array}{r} 53.67 \\ - 2.48 \\ \hline 51.19 \end{array}$$

$40.66 - 3.972 =$

$$\begin{array}{r} 40.660 \\ - 3.972 \\ \hline 36.688 \end{array}$$

(add the zero as a placeholder)

$0.2444 - 0.02444 =$

$$\begin{array}{r} 0.24440 \\ - 0.02444 \\ \hline 0.21996 \end{array}$$

Decimals Exercise

Solutions

III. Multiplication

$$\begin{array}{r} 1 \\ 31.46 \text{ (2 decimal places)} \\ \times 2 \\ \hline 62.92 \end{array}$$

$$\begin{array}{r} 22.3 \text{ --- 2 total decimal places} \\ \times 10.4 \text{ --- 1 decimal place} \\ \hline 223 \\ \times 104 \\ \hline 892 \\ 0 \\ + 22300 \\ \hline 23192 \end{array}$$

231.92

$$\begin{array}{r} 1.002 \text{ 3 places} \\ \times 33.23 \text{ 2 places} \\ \hline 1002 \\ \times 3323 \\ \hline 3006 \\ 20040 \\ 300600 \\ + 3006000 \\ \hline 3329646 \end{array}$$

33.29646

5 total decimal places

$$\begin{array}{r} .0034 \\ \times .002 \\ \hline \end{array}$$

2 x 34 = 68

then, move 7 decimal places:

0.0000068

34 x .21 =

$$\begin{array}{r} 34 \\ \times 21 \\ \hline 34 \\ + 680 \\ \hline 714 \end{array}$$

7.14

move 2 decimals

56 x .302 =

$$\begin{array}{r} 302 \\ \times 56 \\ \hline 1812 \\ + 15100 \\ \hline 16912 \end{array}$$

16.912

34.56 x 2.33 =

$$\begin{array}{r} 3456 \\ \times 233 \\ \hline 10368 \\ 103680 \\ + 691200 \\ \hline 805248 \end{array}$$

80.5248

move 4 decimal places

Note: to check answers, try similar numbers: example: 2 x 35 = 70 so, the decimal is properly placed...

IV. Division

$$\begin{array}{r} 212.11 \\ 3 \overline{) 636.33} \\ \underline{6} \\ 03 \\ \underline{-3} \\ 06 \\ \underline{-6} \\ 03 \\ \underline{-3} \\ 03 \\ \underline{-3} \\ 0 \end{array}$$

45.65 ÷ 5 =

45 divided by 5 = 9
.65 divided by 5 = .13

9.13

$$\begin{array}{r} .11 \overline{) 55} \\ 55 \div 11 = 5 \end{array}$$

so, is it 5? .5? .05? 50? 500?

since 5 x .11 = .55, we need to increase our answer (by 2 decimal places):

500

344 ÷ .02 =

344 divided by 2 = 172

$$\begin{array}{r} 172 \\ \times .02 \\ \hline 3.44 \end{array}$$

172 x 100 = 17,200

So, we must multiply our answer by 100!

.12

$$\begin{array}{r} .4 \overline{) 24.8} \end{array}$$

(multiply both by 10)

248 ÷ 4 = 62

.096 ÷ .8 =

$$\begin{array}{r} .05 \overline{) 255.00} \end{array}$$

(multiply both by 100)

$$\begin{array}{r} 5100 \\ 5 \overline{) 25500} \\ \underline{-25} \\ 05 \\ \underline{-5} \\ 000 \end{array}$$

5100

96 divided by 8 = 12

12 x .8 = 9.6

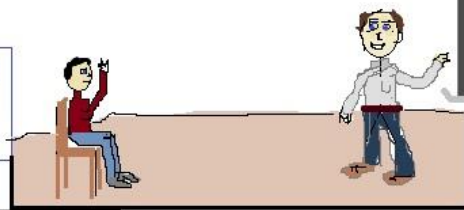
0.9.6

(Need to move 2 decimal places smaller)

.12

Hidden Message

Clue: "A question that a student may ask when learning about decimals?"



Letter Key:

0	1	2	3	4	5	6	7	8	9
A	E	H	I	N	O	P	S	T	W

Solve the following problems. Then, convert the numbers into letters to reveal the answer!

SOLUTIONS

1) $2.7 + 27.27 =$
$$\begin{array}{r} 27.27 \\ + 2.70 \\ \hline 29.97 \end{array}$$

2) $.65 - .108 =$
$$\begin{array}{r} .650 \\ -.108 \\ \hline .542 \end{array}$$

3) $3.706 \div .1 =$ $\Rightarrow 3.706 \div 1/10 \Rightarrow 3.706 \times 10 = 37.06$

4) $12.3 + 4.56 =$
$$\begin{array}{r} 12.30 \\ + 4.56 \\ \hline 16.86 \end{array}$$

5) $0.7 - 0.07 =$
$$\begin{array}{r} 0.70 \\ - .07 \\ \hline 0.63 \end{array}$$

6) $\frac{35}{50} = \frac{70}{100} = \frac{7}{10} = .7$

7) $.14 \times .7 =$ $14 \times 7 = 98$ and since there are 3 decimal spaces: $.098$

8) $(3.6 \times 10^5) \times (2.7 \times 10^6) =$ $3.6 \times 2.7 = 9.72$
and $10^5 \times 10^6 = 10^{11}$

9) $100 - .09 =$
$$\begin{array}{r} 100.00 \\ - .09 \\ \hline 99.91 \end{array}$$

10) $26.4 + 935.3 =$
$$\begin{array}{r} 935.3 \\ + 26.4 \\ \hline 961.7 \end{array}$$

11) $\frac{56}{99} =$ \Rightarrow
$$\begin{array}{r} 0.5656 \\ 99 \overline{)56.000000} \\ \underline{-495} \\ 650 \\ \underline{-594} \\ 560 \\ \underline{-495} \\ 650 \\ \underline{-594} \\ 56\dots \end{array}$$

(move both decimals 2 places)

12) $.63 \div .21 =$ $\Rightarrow 63 \div 21 = 3$

13) $\frac{1}{25} = \frac{4}{100} = 4\% \text{ or } .04$

14) $102.02 - 10.202 =$
$$\begin{array}{r} 102.020 \\ - 10.202 \\ \hline 91.818 \end{array}$$

29. $\boxed{9}7 \rightarrow$ W

$.54 \boxed{2} \rightarrow$ H

37. $\boxed{0}60 \rightarrow$ A

16. $\boxed{8}6 \rightarrow$ T

$.6 \boxed{3} \rightarrow$ I

$\boxed{.7} \rightarrow$ S

$.09 \boxed{8} \rightarrow$ T

9.7 $\boxed{2} \times 10^{11} \rightarrow$ H

99.9 $\boxed{1} \rightarrow$ E

9 $\boxed{6}1.7 \rightarrow$ P

$. \boxed{5}656 \rightarrow$ O

$\boxed{3} \rightarrow$ I

$.0 \boxed{4} \rightarrow$ N

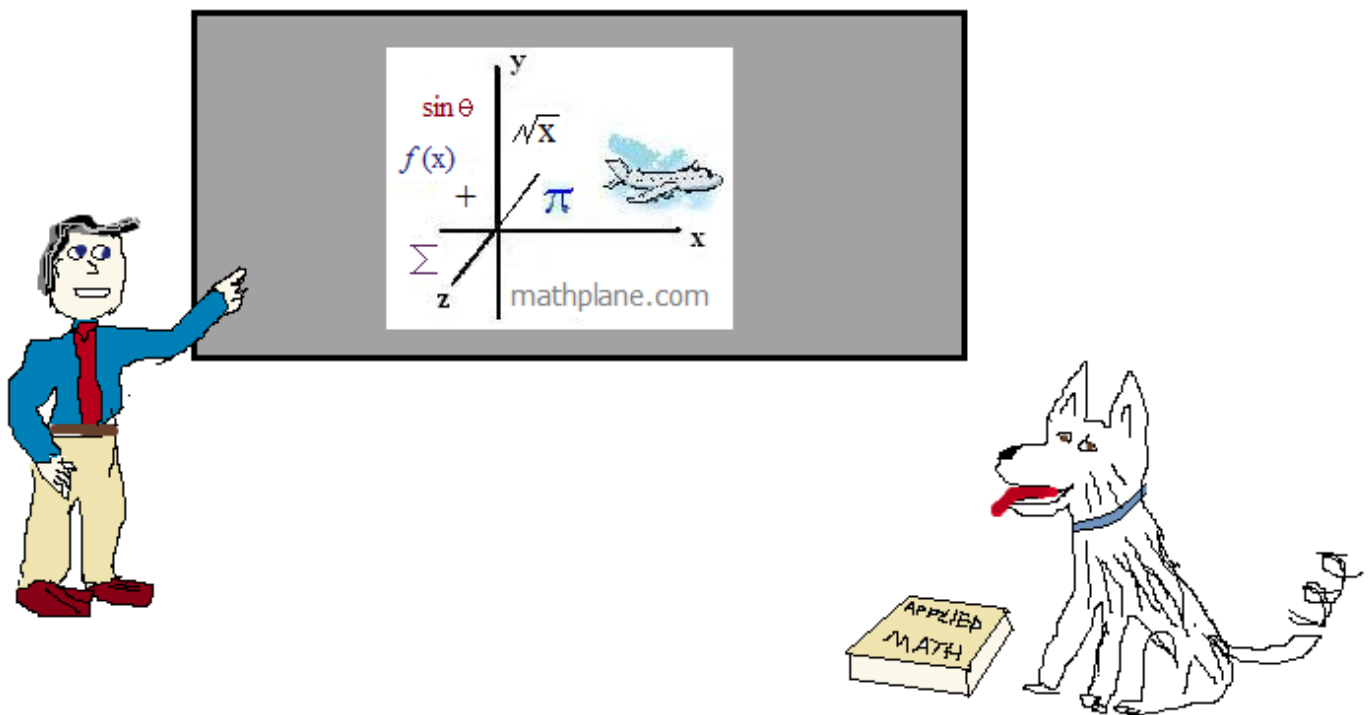
91. $\boxed{8}18 \rightarrow$ T

A question that a student may ask when learning about decimals?
"What is the 'point'?"

Thanks for visiting. (Hope it helped!)

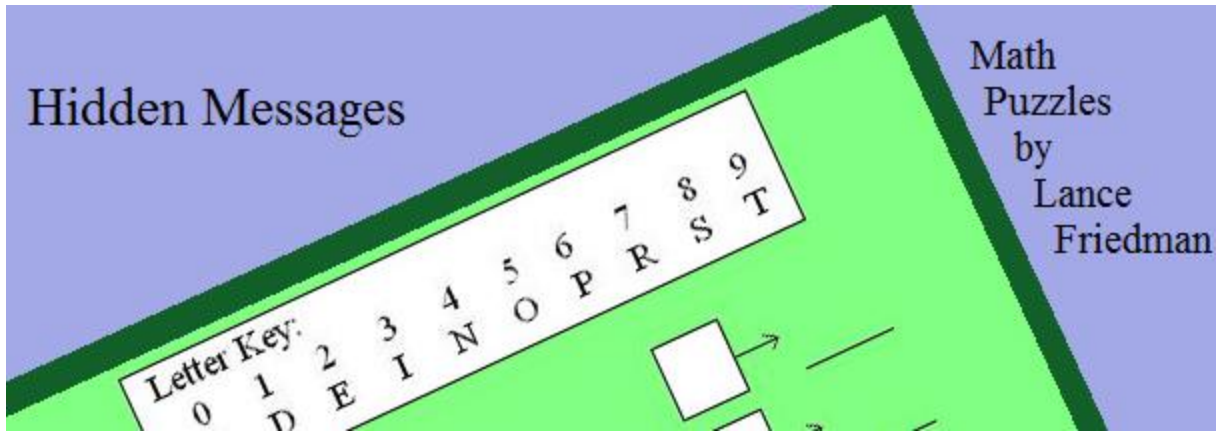
If you have questions, suggestions, or requests, then let us know.

Cheers



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