DIY: Long Division with Numbers

To review long division with numbers, watch the following set of YouTube videos explaining the basic techniques for doing long division with numbers, followed by 16 division practice problems for you to try covering the basic techniques, with answers and detailed solutions. Some additional resources are included for more practice at the end.

1. Basics of Division
2. Long Division Basics
3. Long Division with 2-digit Divisors
4. Converting fractions to Decimals and Long Division with Decimals
5. Examples of long division with decimals

Practice problems: The following problems use the techniques demonstrated in the above videos. The answers are given after the problems. Then detailed solutions, if you need them, are given after the answer section. For further assistance and help please contact Math Assistance Area.

1. Fill in the blanks: \[43 \div 60 = \underline{\quad} \underline{\quad} = \underline{\quad} \underline{\quad}\]

2. Write a division problem using the information that \[7 \times 5 = 35\].

3. \[4 \underline{\quad} 96 = \]

4. Divide, then express your answer in the 3 different forms indicated.

\[6 \underline{\quad} 219 = \underline{\quad} \underline{\quad} \underline{\quad}\]
\[= \underline{\quad}.\]
\[= \underline{\quad} \underline{\quad} \underline{\quad}\]
5. Divide, then express your answer in the 3 different forms indicated.  
\[ \frac{432}{21} = \square \ \text{r} \ \square \]
(Note: in the decimal form, round your answer to three decimal places.

\[ = \square . \ \square \]

\[ = \square \]  

6. Divide, then express your answer in the 3 different forms indicated. (This will be a repeating decimal.)  
\[ \frac{524}{72} = \square \ \text{r} \ \square \]

\[ = \square . \]

\[ = \square \]  

7. Divide:  
\[ 2.4 \sqrt{9.12} \]  

8. Divide. Then round your answer to 3 decimal places  
\[ 2.84 \sqrt{15.9} \]  

9. \[ \frac{0.01932}{7} = \]  

10. \[ \frac{4.48}{.4} = \]  

11. \[ 5.48 \div 0.8 = \]  

12. Divide 524 by .04  

13. Divide: \[ \frac{0.45}{2.2} = \]  

Give your answer in the exact form (as a repeating decimal) and rounded to five decimal places. Also, write an equivalent fraction in lowest terms.
14. Convert the fraction $\frac{3}{7}$ to a repeating decimal. (Hint: you will have to carry the division out several places before it starts to repeat!)

15. Which is larger: $\frac{5}{16}$ or $\frac{8}{23}$? (Hint: convert both fractions to decimals.)

16. You have $25.82. What is the maximum amount of money you could give to each of your 6 friends if each must have the same amount? How much would you have left?

**Answers:**

1. $\frac{43}{60} = \frac{43}{60}$

2. If $7 \times 5 = 35$, then $35 \div 7 = 5$ or $35 \div 5 = 7$

3. $24 = 36 \div 3$

4. $36 \div 2 = 18$ remainder 0

5. $20 \div 12 = 1$ remainder 8

6. $118 \div 28 = 4$ remainder 6

7. $3.8$

8. $5.599$

9. $0.00276$

10. $11.2$

11. $6.85$

12. $13,100$

13. $0.2045 = 0.2045$

14. $\frac{3}{7} = 0.428571$

15. $\frac{8}{23} > \frac{5}{16}$

16. $\$4.30$ with $\$0.02$ (2 cents) left
Detailed Solutions:

3. \( 4 \sqrt{196} \rightarrow 4 \sqrt{196} \rightarrow 4 \sqrt{196} \rightarrow 4 \sqrt{196} \)

\[ 
\begin{align*}
2 & \\
-8 & \\
\frac{16}{16} & \\
24 &
\end{align*}
\]

so, \( 196 \div 4 = 24 \)

4. \( 6 \sqrt{219} \rightarrow 6 \sqrt{219} \rightarrow 6 \sqrt{219} \rightarrow 6 \sqrt{219} \)

\[ 
\begin{align*}
3 & \\
-18 & \\
39 & \\
-36 & \\
\frac{3}{3} &
\end{align*}
\]

so, \( 219 \div 6 = 36 \text{ r } 3 \)

To get the answer as a decimal:

\[ 
\begin{align*}
36 & \\
-18 & \\
39 & \\
-36 & \\
30 &
\end{align*}
\]

so \( 219 \div 6 = 36.5 \)

For the mixed number, we have that \( 219 \div 6 = 36 \text{ r } 3 \)

\[ 36 \frac{3}{6} \]

reduce: \( 36 \frac{1}{2} \)
5. \[ \begin{align*}
\frac{2}{432} \rightarrow & \frac{20}{432} \rightarrow \frac{20.5}{432.0} \rightarrow \\
\frac{20.5}{432.06} \rightarrow & \frac{20.57}{432.06} \rightarrow \\
\frac{20.57}{432.06} \rightarrow & \frac{20.5714}{432.0000} \\
\end{align*} \]

So, \( 432 \div 21 = 20.5714 \ldots \) 2\text{nd} decimal place is 15.

\[ \begin{align*}
\approx & \quad \text{(note: } \approx \text{ means "is approximately equal to")} \\
\end{align*} \]

To get the mixed number, recall \( 21\frac{432}{21} = 20 \div 12 \)

\[ \begin{align*}
&= 20 \frac{12}{21} \quad \text{(reduce fraction)} \\
&= 20 \frac{4}{7} \\
\end{align*} \]
6. \[ 72 \overline{85.24} \rightarrow 72 \overline{85.24} \rightarrow 72 \overline{85.24} \rightarrow 72 \overline{85.24} \rightarrow 72 \overline{85.24} \]

\[ \begin{array}{c|c|c|c|c}
  & 1 & 1 & 1 & 1 \\
\hline
72 & 85.24 & -72 & 13.2 & -72 \\
\hline
 & 132 & -72 & 60.4 & -57.6 \\
\hline
 & 260 & -21.6 & 640 & -57.6 \\
\hline
 & 280 & -216 & & 640 \\
\hline
\end{array} \]

\[ \frac{85.24}{72} = 118 \text{ r } 28 \]

Decimal: \[ 72 \overline{85.24.0} \rightarrow 72 \overline{85.24.00} \rightarrow 72 \overline{85.24.000} \rightarrow = 118.3 \overline{3} \]

Remainder is repeating, so we can stop division. The "3" in the quotient will repeat.

Mixed number: \[ 72 \overline{85.24} = 118 \text{ r } 28 = 118 \frac{28}{72} \]

\[ \frac{28}{72} = \frac{4.7}{9.18} = \frac{7}{18} \]

\[ = 118 \frac{7}{18} \]

7. \[ 2.4 \overline{19.12} \rightarrow 24 \overline{19.12} \rightarrow 24 \overline{19.12} \rightarrow 24 \overline{19.12} \rightarrow 24 \overline{19.12} \]

\[ \begin{array}{c|c|c|c|c}
  & 3 & 3 & 3 & 3 \\
\hline
24 & 19.12 & -72 & 19.2 & -192 \\
\hline
 & 132 & -72 & & \\
\hline
 & 60.4 & -57.6 & & \\
\hline
 & 280 & -216 & & \\
\hline
\end{array} \]

So, \[ \frac{19.12}{2.4} = 3.8 \]
8. \[ 2.84 \sqrt{15.9} \rightarrow 2.84 \sqrt{15.90} \rightarrow 284 \div 1590 \rightarrow \frac{5}{170} \]
\[
\begin{array}{c}
284 \\
-1420 \\
\hline
1420 \\
-1700 \\
\hline
1700 \\
-1700 \\
\hline
0 \\
\end{array}
\]

Note: When we “guess” what digit will go into the quotient line, we are estimating, in this case, how many times \(5\) goes into \(1700\). I guessed \(4\) times, but \(6 \times 284 = 1704\) which is too big. Now I go back and correct.

\[284 \text{ goes into } 1700.\]

We need our answer correct to 3 decimal places, so we must carry the division out to 4 decimal places to round correctly.

\[5.5985 \ldots \approx 5.599\]

Note: If we were asked for the quotient correct to 2 decimal places, \[5.5985 \approx 5.60\]

9. \[0.01932 \div 7 = \frac{1}{7019.32} \rightarrow 7 \div 0.01932 \div 0.14 \div 53 \div 49 \div 42 \]

First non-zero digit will be placed over the 9.

10. \[4.48 \times 10 = 44.8 = 4 \div 44.8 = 4 \div 49.8 \]
\[= \frac{11.2}{4}\]
\[= \frac{11.2}{4}\]
\[= \frac{11.2}{4}\]
\[= \frac{11.2}{4}\]
\[= \frac{11.2}{4}\]
\[= \frac{11.2}{4}\]
\[= \frac{11.2}{4}\]
11. \( 5.48 \div 0.8 = 8\overline{6} \)

12. \( \frac{524}{0.04} = 13,100 \)

13. \( \frac{45}{2.2} = 20.4545\ldots \)

\[ \begin{array}{c}
\text{as a fraction, } \frac{45}{2.2} = \frac{45}{22} = 2.04545\ldots = \frac{9}{44} \\
\end{array} \]
14. \[
\begin{array}{c}
  3 \div 7 \\
  \underline{-28} \\
  14 \\
  -14 \\
  0 \\
  \underline{-56} \\
  40 \\
  \underline{-40} \\
  49 \\
  -49 \\
  10 \\
  \underline{-7} \\
  30 \\
  \underline{-28} \\
  2
\end{array}
\]

The remainders have begun to repeat.

\[
\frac{3}{7} = 0.428571428571... = 0.\overline{428571}
\]

15. \[
\begin{array}{c}
  5 \div 16 \\
  \underline{-48} \\
  20 \\
  \underline{-16} \\
  4
\end{array}
\]

So \( \frac{5}{16} > \frac{5}{10} \).

16. $25.82 \div 6 = \boxed{4.30}$

Stop at 2 decimal places, since this is money. You could give up to $4.30 to each of your 6 friends with 2¢ ($0.02) left over.
Additional Resources

For more practice problems, click on the following link for some long division worksheets:

Practice with Long Division

Practice with Long Division with Decimals