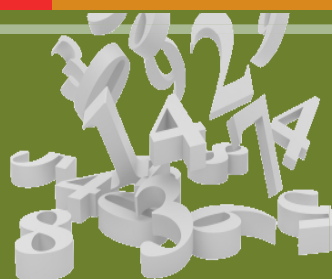


NUMERACY:

The Basics Workbook



Set L: Dividing Decimals

Companion Workbook to Numeracy: The Basics Video Series

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INTRODUCTION

What is Numeracy: The Basics Workbook?

This workbook is intended to accompany Workplace Education Manitoba's (WEM) Numeracy: The Basics Video Series, a set of 50 videos that explain essential numeracy concepts.

The refresher videos cover 25 critical numeracy topics, each broken into concept and practice.

The video series and accompanying downloadable workbooks can be found on the WEM website at http://www.wem.mb.ca/learning_on_demand.aspx

These Numeracy: The Basics workbooks provide an opportunity for additional skill-building practice.

Numeracy: The Basics topics are:

- Order of Operations 1
- Order of Operations 2
- Adding & Subtracting Fractions 1
- Adding & Subtracting Fractions 2
- Multiplying & Dividing Fractions
- Mixed & Improper Fractions
- Operations with Mixed Fractions 1
- Operations with Mixed Fractions 2
- Operations with Mixed Fractions 3
- Adding & Subtracting Decimals
- Multiplying Decimals
- Dividing Decimals
- Order of Operations & Decimals
- Decimals, Fractions & Percent 1
- Decimals, Fractions & Percent 2
- Imperial Conversions
- Metric Conversions
- Metric and Imperial Conversions
- Geometry 1 – Perimeter
- Geometry 2 – Area
- Geometry 3- Volume
- Solving Equations 1
- Solving Equations 2
- Ratio & Proportion
- Averages



DIVIDING DECIMALS

This workbook contains five skill-building practice sections. Solutions can be found at the end of the workbook.

Practice Section A

Calculate the following. Stop dividing if you get more than 5 decimal places in your answer.

1. $4.4 \div 2$ = _____

2. $5.4 \div 3$ = _____

3. $3.5 \div 4$ = _____

4. $8.5 \div 2.5$ = _____

5. $9.3 \div 1.5$ = _____

6. $0.054 \div 0.003$ = _____

7. $3.8 \div 0.5$ = _____

8. $5.7 \div 0.25$ = _____

9. $13.34 \div 5.8$ = _____

10. $12.3 \div 1.6$ = _____

11. $9.3 \div 1.8$ = _____

12. $12.9 \div 3.3$ = _____

13. $9.8 \div 2.7$ = _____

14. $12.97 \div 1.5$ = _____

15. $14.87 \div (1.5 \div 0.5)$ = _____

**Practice Section B**

Calculate the following. Stop dividing if you get more than 5 decimal places in your answer.

1. $0.375 \div 0.125 = \underline{\hspace{2cm}}$

2. $53.3 \div 2.05 = \underline{\hspace{2cm}}$

3. $14.8 \div 2.5 = \underline{\hspace{2cm}}$

4. $15.3 \div 2.4 = \underline{\hspace{2cm}}$

5. $20.41 \div 2.5 = \underline{\hspace{2cm}}$

6. $21.525131 \div 6.1 = \underline{\hspace{2cm}}$

7. $4 \div 0.48 = \underline{\hspace{2cm}}$

8. $5.28 \div 1.8 = \underline{\hspace{2cm}}$

9. $3.6 \div 3.7 = \underline{\hspace{2cm}}$

10. $12.28 \div 2.4 = \underline{\hspace{2cm}}$

11. $12.9 \div 6.6 = \underline{\hspace{2cm}}$

12. $17.88 \div 1.44 = \underline{\hspace{2cm}}$

13. $684 \div 40.5 = \underline{\hspace{2cm}}$

14. $21.63 \div 1.8 = \underline{\hspace{2cm}}$

15. $0.875 \div 0.52 = \underline{\hspace{2cm}}$

**Practice Section C**

Calculate the following.

1. $2254 \div 4.6$ = _____
2. $190.875 \div 0.625$ = _____
3. $12.9 \div 3.3 \div 0.05$ = _____
4. $144.48 \div 2.2$ = _____
5. $456.8 \div 3 \div 0$ = _____

Practice Section D

In this section, solutions for the practice questions contain commonly-made errors. For each question, circle the error(s) and give a correct solution.

1. Samuel says “when you divide any whole number by a decimal, the original number always gets larger.” Leslie disagrees and responds by saying “I am convinced that any whole number divided by a decimal can result in a number smaller or larger than the original.” Would you support Samuel or Leslie? Defend your choice.



2. Below is a possible solution to a question that contains some error(s). Circle the error(s) and present a correct solution.

Calculate:

$$164.5 \div 0.47$$

Solution:

$$164.5 \div 0.47$$

$$= 47 \overline{)1645} \begin{array}{r} 35 \\ \end{array}$$

$$\underline{-141}$$

$$235$$

$$\underline{-235}$$

$$(0)$$

Practice Section E

Challenge Question. If you can do this one, then you get an A⁺. 😊

1. a) Based on your knowledge of decimals, give an approximation of the answer to the question $946324.5897 \div 358.48$. Explain the rationale for your best approximation.
- b) Calculate: $946324.5897 \div 358.48$
Round to the nearest whole number.
- c) How does your answer in (b) compare to your approximation in (a)?



SOLUTIONS

Set L

Dividing Decimals

**DIVIDING DECIMALS****Practice Section A**

1. Solution:

$$\begin{array}{r} 4.4 \div 2 \\ \underline{2 \overline{)4.4}} \\ -4 \\ \hline 04 \\ -4 \\ \hline 0 \end{array}$$

2. Solution:

$$\begin{array}{r} 5.4 \div 3 \\ \underline{3 \overline{)5.4}} \\ -3 \\ \hline 24 \\ -24 \\ \hline 0 \end{array}$$

3. Solution:

$$\begin{array}{r} 3.5 \div 4 \\ \underline{4 \overline{)3.500}} \\ -0 \\ \hline 35 \\ -32 \\ \hline 30 \\ -28 \\ \hline 20 \\ -20 \\ \hline 0 \end{array}$$

4. Solution:

$$\begin{array}{r} 8.5 \div 2.5 \\ \underline{2.5 \overline{)85.0}} \\ -75 \\ \hline 100 \\ -100 \\ \hline (0) \end{array}$$

5. Solution:

$$\begin{array}{r} 9.3 \div 1.5 \\ \underline{1.5 \overline{)93.0}} \\ -90 \\ \hline 30 \\ -30 \\ \hline 0 \end{array}$$

6. Solution:

$$\begin{array}{r} 0.054 \div 0.003 \\ \underline{3 \overline{)54}} \\ -3 \\ \hline 24 \\ -24 \\ \hline 0 \end{array}$$



7. Solution:

$$3.8 \div 0.5$$

$$\begin{array}{r} 7.6 \\ = 5 \overline{)38.0} \\ \underline{-35} \\ 30 \\ \underline{-30} \\ 0 \end{array}$$

8. Solution:

$$5.7 \div 0.25$$

$$\begin{array}{r} 22.8 \\ = 25 \overline{)570.0} \\ \underline{-50} \\ 70 \\ \underline{-50} \\ 200 \\ \underline{-200} \\ 0 \end{array}$$

9. Solution:

$$13.34 \div 5.8$$

$$\begin{array}{r} 2.3 \\ = 58 \overline{)133.4} \\ \underline{-116} \\ 174 \\ \underline{-174} \\ 0 \end{array}$$

10. Solution:

$$12.3 \div 1.6$$

$$\begin{array}{r} 7.6875 \\ = 16 \overline{)123.0000} \\ \underline{-112} \\ 110 \\ \underline{-96} \\ 140 \\ \underline{-128} \\ 120 \\ \underline{-112} \\ 80 \\ \underline{-80} \\ 0 \end{array}$$

11. Solution:

$$9.3 \div 1.8$$

$$\begin{array}{r} 5.166 \\ = 18 \overline{)93.000} = 5.1\bar{6} \\ \underline{-90} \\ 30 \\ \underline{-18} \\ 120 \\ \underline{-108} \\ 120 \\ \underline{-108} \\ 120 \end{array}$$

**12.** Solution:

$12.9 \div 3.3$

$$\begin{array}{r} 3.9090 \\ = 33 \overline{)129.0000} = 3.9090 \\ \underline{-99} \\ 300 \\ \underline{-297} \\ 300 \\ \underline{-297} \\ 3 \end{array}$$

13. Solution:

$9.8 \div 2.7$

$$\begin{array}{r} 3.629 \\ = 27 \overline{)98.000} = 3.629 \\ \underline{-81} \\ 170 \\ \underline{-162} \\ 80 \\ \underline{-54} \\ 260 \\ \underline{-243} \\ 170 \end{array}$$

14. Solution:

$12.97 \div 1.5$

$$\begin{array}{r} 8.646 \\ = 15 \overline{)129.700} = 8.646 \\ \underline{-120} \\ 97 \\ \underline{-90} \\ 70 \\ \underline{-60} \\ 100 \\ \underline{-90} \\ 100 \end{array}$$

15. Solution:

$1.5 \div 0.5$

$$\begin{array}{r} 3 \\ = 5 \overline{)15} \\ \underline{-15} \\ 0 \end{array}$$

$14.87 \div 3$

$$\begin{array}{r} 4.956 \\ = 3 \overline{)14.870} = 4.956 \\ \underline{-12} \\ 28 \\ \underline{-27} \\ 17 \\ \underline{-15} \\ 20 \\ \underline{-18} \\ 20 \end{array}$$

**Practice Section B**

1. Solution:
 $0.375 \div 0.125$

$$\begin{array}{r} 3 \\ 125 \overline{)375} \\ \underline{-375} \\ 0 \end{array}$$

2. Solution:
 $53.3 \div 2.05$

$$\begin{array}{r} 26 \\ 205 \overline{)5330} \\ \underline{-410} \\ 1230 \\ \underline{-1230} \\ 0 \end{array}$$

3. Solution:
 $14.8 \div 2.5$

$$\begin{array}{r} 5.92 \\ 25 \overline{)148.0} \\ \underline{-125} \\ 230 \\ \underline{-225} \\ 50 \\ \underline{-50} \\ 0 \end{array}$$

4. Solution:
 $15.3 \div 2.4$

$$\begin{array}{r} 6.375 \\ 24 \overline{)153.00000} \\ \underline{-144} \\ 90 \\ \underline{-72} \\ 180 \\ \underline{-168} \\ 120 \\ \underline{-120} \\ 0 \end{array}$$

5. Solution:
 $20.41 \div 2.5$

$$\begin{array}{r} 8.164 \\ 25 \overline{)204.100} \\ \underline{-200} \\ 41 \\ \underline{-25} \\ 160 \\ \underline{-150} \\ 100 \\ \underline{-100} \\ 0 \end{array}$$



6. Solution:
 $21.525131 \div 6.1$

$$= 61 \overline{)215.25131}$$

$$\begin{array}{r} 3.52871 \\ -183 \\ \hline 322 \\ -305 \\ \hline 175 \\ -122 \\ \hline 531 \\ -488 \\ \hline 433 \\ -427 \\ \hline 61 \\ -61 \\ \hline (0) \end{array}$$

7. Solution:
 $4 \div 0.48$

$$= 48 \overline{)400.00} = 8.\overline{3}$$

$$\begin{array}{r} 8.33 \\ -384 \\ \hline 160 \\ -144 \\ \hline 160 \end{array}$$

8. Solution:
 $5.28 \div 1.8$

$$= 18 \overline{)52.800} = 2.9\overline{33}$$

$$\begin{array}{r} 2.933 \\ -36 \\ \hline 168 \\ -162 \\ \hline 60 \\ -54 \\ \hline 60 \end{array}$$

9. Solution:
 $3.6 \div 3.7$

$$= 37 \overline{)36.000} = 2.9\overline{72}$$

$$\begin{array}{r} 0.972 \\ -333 \\ \hline 270 \\ -259 \\ \hline 110 \\ -74 \\ \hline 360 \end{array}$$

10. Solution:
 $12.28 \div 2.4$

$$= 24 \overline{)122.8000} = 5.1\overline{16}$$

$$\begin{array}{r} 5.1166 \\ -120 \\ \hline 28 \\ -24 \\ \hline 40 \\ -24 \\ \hline 160 \\ -144 \\ \hline 160 \end{array}$$



11. Solution:
 $12.9 \div 6.6$

$$\begin{array}{r} 1.95454 \\ = 66 \overline{)129.00000} = 1.954 \\ \underline{-66} \\ 630 \\ \underline{-594} \\ 360 \\ \underline{-330} \\ 300 \\ \underline{-264} \\ 360 \\ \underline{-330} \\ 30 \end{array}$$

12. Solution:
 $17.88 \div 1.44$

$$\begin{array}{r} 12.4166 \\ = 144 \overline{)1788.0000} = 12.41\bar{6} \\ \underline{-144} \\ 348 \\ \underline{-288} \\ 600 \\ \underline{-576} \\ 240 \\ \underline{-144} \\ 960 \\ \underline{-864} \\ 960 \end{array}$$

13. Solution:
 $684 \div 40.5$

$$\begin{array}{r} 16.88 \\ = 405 \overline{)6840.00} = 16.\bar{8} \\ \underline{-405} \\ 2790 \\ \underline{-2430} \\ 3600 \\ \underline{-3240} \\ 3600 \\ \underline{-3240} \\ 360 \end{array}$$

14. Solution:
 $21.63 \div 1.8$

$$\begin{array}{r} 12.0166 \\ = 18 \overline{)216.3000} = 12.01\bar{6} \\ \underline{-18} \\ 36 \\ \underline{-36} \\ 03 \\ \underline{-0} \\ 30 \\ \underline{-18} \\ 120 \\ \underline{-108} \\ 120 \end{array}$$



15. Solution:

$$0.875 \div 0.52$$

$$\begin{array}{r} 1.68269 \\ = 52 \overline{)87.50000} \\ \underline{-52} \\ 355 \\ \underline{-312} \\ 430 \\ \underline{-416} \\ 140 \\ \underline{-104} \\ 360 \\ \underline{-312} \\ 480 \\ \underline{-468} \\ 12 \end{array}$$

**Practice Section C**

1. Solution:

$$\begin{array}{r}
 2254 \div 4.6 \\
 = 46 \overline{)22540} \\
 \underline{184} \\
 414 \\
 \underline{-414} \\
 0 \\
 \underline{-0} \\
 0
 \end{array}$$

2. Solution:

$$\begin{array}{r}
 190.875 \div 0.625 \\
 = 625 \overline{)190875.0} \\
 \underline{-1875} \\
 337 \\
 \underline{-0} \\
 3375 \\
 \underline{-3125} \\
 2500 \\
 \underline{-2500} \\
 0
 \end{array}$$

3. Solution:

$$\begin{array}{r}
 12.9 \div 3.3 \\
 = 33 \overline{)129.0000} = 3.90 \\
 \underline{-99} \\
 300 \\
 \underline{-297} \\
 300 \\
 \underline{-297} \\
 30
 \end{array}$$

$$\begin{array}{r}
 3.90 \div 0.05 \\
 = 5 \overline{)390.909} = 78.18 \\
 \underline{-35} \\
 40 \\
 \underline{-40} \\
 9 \\
 \underline{-5} \\
 40 \\
 \underline{-40} \\
 9 \\
 \underline{-5} \\
 4
 \end{array}$$

4. Solution:

$$\begin{array}{r}
 144.48 \div 2.2 \\
 = 22 \overline{)1444.80000} = 65.672 \\
 \underline{-132} \\
 124 \\
 \underline{-110} \\
 148 \\
 \underline{-132} \\
 160 \\
 \underline{-154} \\
 60 \\
 \underline{-44} \\
 160
 \end{array}$$

**5. Solution:**

There is no need to do the first division ($456.8 \div 3$) because you can NEVER divide by 0! It is impossible to divide something (i.e. $456.8 \div 3$) by nothing (i.e. $\div 0$), therefore this question has no solution.

Practice Section D

1. Solution:

The answer to this question depends on the definition of decimal. It is true that a decimal greater than 0 and less than 1 would make Samuel correct as in the example $12 \div 0.5 = 24$. Really though, a decimal is defined as any number with a decimal point, for example $12 \div 1.5 = 8$. Therefore, 0.5 and 1.5 are both considered decimal numbers and so Leslie is correct.

2. Solution:

There is one error in line 1. The decimal was moved 2 places to the right on the 0.47, but only moved 1 decimal place to the right on the 164.5.

The correct solution is:

$$\begin{array}{r} 164.5 \div 0.47 \\ = 47 \overline{) 16450} \\ \underline{-141} \\ 235 \\ \underline{-235} \\ 0 \\ \underline{-0} \\ (0) \end{array}$$

**Practice Section E**

1. a) Solution:
To find a good estimate, pick some 'nice' numbers to divide:

$$\begin{aligned} \text{Some good estimates would be:} \quad & 920000 \div 400 = 2300 \\ & 950000 \div 400 = 2375 \\ & 1000000 \div 400 = 2500 \end{aligned}$$

The best estimate from the list would be 2500.

- b) Solution:

$$\begin{array}{r} 946324.5897 \div 358.48 \\ = 35848 \overline{) 94632458.970} \\ \underline{-71696} \\ 229364 \\ \underline{-215088} \\ 142765 \\ \underline{-107544} \\ 352218 \\ \underline{-322632} \\ 295869 \\ \underline{-286784} \\ 90857 \\ \underline{-71696} \\ 191610 \\ \underline{-179240} \\ 12370 \end{array}$$

The result of the division, rounded to the nearest whole number, is 2640.

- c) Solution:
The estimated and the actual answer are close, although no estimates were over the actual result.