Workplace Education Manitoba

NUMERACY:
The Basics Workbook

Set P: Imperial Conversions

Companion Workbook to Numeracy: The Basics Video Series

Watch the video for this workbook at
www.wem.mb.ca/learning_on_demand.aspx

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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

IMPERIAL CONVERSIONS

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

Practice Section A

Convert each of the following Imperial measures into the units indicated. Round each answer to one decimal place, if rounding is necessary.

1. $12\ ft = \_\_\_\_\ yd$
2. $4\ ft = \_\_\_\_\ in$
3. $4\ yd = \_\_\_\_\ in$
4. $8\ yd = \_\_\_\_\ ft$
5. $7\ ft = \_\_\_\_\ in$
6. $13\ ft = \_\_\_\_\ in$
7. $36\ in = \_\_\_\_\ ft$
8. $29\ in = \_\_\_\_\ yd$
9. $5.5\ ft = \_\_\_\_\ in$
10. $6\ ft = \_\_\_\_\ yd$
11. $7\ yd = \_\_\_\_\ ft$
12. $27\ in = \_\_\_\_\ ft$
13. $7.5\ yd = \_\_\_\_\ ft$
14. $15\ yd = \_\_\_\_\ in$
15. $67\ in = \_\_\_\_\ yd$

Practice Section B

Convert each of the following Imperial measures into the units indicated. Round each answer to one decimal, if rounding is necessary.

1. $107\,in = \_\_\_\ ft$

2. $142\,in = \_\_\_\ yd$

3. $17.5\,yd = \_\_\_\ ft$

4. $11.25\,yd = \_\_\_\ in$

5. $322\ ft = \_\_\_\ yd$

6. $5.5\,yd - 24\,in = \_\_\_\_\_\ ft$

7. $1.5\,yd + 5\ ft = \_\_\_\_\_\ in$

8. $36\,in + 3\ ft = \_\_\_\_\_\ yd$

9. $3\,yd - 5\ ft = \_\_\_\_\_\ in$

10. $4\,yd - 21\ in = \_\_\_\_\_\ ft$

11. $4\,yd + 2\ ft - 6\,in = \_\_\_\_\_\ in$

12. $5\ ft + 21\,in - 1.5\,yd = \_\_\_\_\_\ in$

13. $5\,yd - 2.5\ ft + 66\,in = \_\_\_\_\_\ ft$

14. $1.5\,yd + 33\,in + 6\ ft = \_\_\_\_\_\ yd$

15. $7.5\,yd - 54\,in - 2.75\,ft = \_\_\_\_\_\ ft$

Practice Section C

Follow the instructions for each conversion question. Round each answer to one decimal place, if rounding is necessary.

1. Convert 89 inches into ___ yd + ___ ft + ___ in.

2. Convert 3.875 yards into ___ yd + ___ ft + ___ in.

3. $\frac{34\,in}{0.25}+\frac{5}{2}\,ft\times 3-1.25\,yd=$ _____ ft

4. $(7.5\,yd-54\,in-2.75\,ft)-(1.5\,yd-15\,in+1.75\,ft)=$ _____ ft

5. $(4.5\,yd-119\,in)+1\,ft-\left(\frac{1.5\,ft}{0.5}-42\,in+1.125\,yd\div\frac{1}{4}\right)=$ _____ yd

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

$$6\,ft+41\,in-2.5\,yd=\_\_\_\_\_\,in$$

$$6\,\cancel{ft}\times\frac{12\,in}{1\,\cancel{ft}}+41\,in-2.5\,\cancel{yd}\times\frac{12\,in}{1\,\cancel{yd}}=\_\_\_\_\_\,in$$

$$72\,in+41\,in-2.5\,\cancel{yd}\times\frac{12\,in}{1\,\cancel{yd}}=\_\_\_\_\_\,in$$

$$72\,in+38.5\,in\times\frac{12\,in}{1\,\cancel{yd}}\,\cancel{yd}=\_\_\_\_\_\,in$$

$$72\,in+462\,in=\_\_\_\_\_\,in$$

$$=534\,in$$

Practice Section E
Challenge Question. If you can do this one, then you get an A^{+}. ☺

Explain, with a good example problem and solution (including a description), how you know when dividing two numbers will result in a quotient with repeating decimals of some kind?

SOLUTIONS

Set P

Imperial Conversions

IMPERIAL CONVERSIONS

Practice Section A

1. Solution:

$12\ ft = \_\_\_\_\ yd$

$(4)\ 12\ \cancel{ft} \times \frac{1\,yd}{3\ \cancel{ft}} = 4\ yd$

2. Solution:

$4\ ft = \_\_\_\_\ in$

$4\ \cancel{ft} \times \frac{12in}{1\ \cancel{ft}} = 48\,in$

3. Solution:

$4\,yd = \_\_\_\_\ in$

$4\ \cancel{yd} \times \frac{36in}{1\ \cancel{yd}} = 144\,in$

4. Solution:

$8\ yd = \_\_\_\_\ ft$

$8\ \cancel{yd} \times \frac{3\,ft}{1\,\cancel{yd}} = 24\ ft$

5. Solution:

$7\ ft = \_\_\_\_\ in$

$7\ \cancel{ft} \times \frac{12in}{1\ \cancel{ft}} = 84\,in$

6. Solution:

$13\,ft = \_\_\_\_\ in$

$13\ \cancel{ft} \times \frac{12in}{1\ \cancel{ft}} = 156\,in$

7. Solution:

$36\,in = \_\_\_\_\ ft$

$36\,\cancel{in} \times \frac{1\,ft}{12\,\cancel{in}} = \frac{36}{12}\ ft = 3\ ft$

8. Solution:

$29\ in = \_\_\_\_\ yd$

$29\,\cancel{in} \times \frac{1yd}{36\,\cancel{in}} = \frac{29}{36}\,yd = 0.8\,yd$

9. Solution:

$5.5\ ft = \_\_\_\_\ in$

$5.5\ \cancel{ft} \times \frac{12in}{1\ \cancel{ft}} = 66\,in$

10. Solution:

$6\ ft = \_\_\_\_\ yd$

$6\ \cancel{ft} \times \frac{1\,yd}{3\ \cancel{ft}} = \frac{6}{3}\,yd = 2\,yd$

11. Solution:

$7\ yd = \_\_\_\_\ ft$

$7\ \cancel{yd} \times \frac{3\,ft}{1\,\cancel{yd}} = 21\,ft$

12. Solution:

$27\,in = \_\_\_\_\ ft$

$27\,\cancel{in} \times \frac{1\,ft}{12\,\cancel{in}} = \frac{27}{12}\ ft = 2\frac{1}{4}\ ft = 2.25\,ft = 2.3\ ft$

13. Solution:

$7.5\,yd = \_\_\_\,ft$

$$7.5\,\cancel{yd} \times \frac{3\,ft}{1\,\cancel{yd}} = 22.5\,ft$$

14. Solution:

$15\,yd = \_\_\_\_\,in$

$$15\,\cancel{yd} \times \frac{36in}{1\,\cancel{yd}} = 540\,in$$

15. Solution:

$67\,in = \_\_\_\,yd$

$$67\,\cancel{in} \times \frac{1yd}{36\,\cancel{in}} = \frac{67}{36}\,yd = 1\frac{31}{36}\,yd = 1.9\,yd$$

Practice Section B

1. Solution:

$107\,in = \_\_\_\,ft$

$$107\,\cancel{in} \times \frac{1\,ft}{12\,\cancel{in}} = \frac{107}{12}\,ft = 8\frac{11}{12}\,ft = 8.9\,ft$$

2. Solution:

$142\,in = \_\_\_\,yd$

$$142\,\cancel{in} \times \frac{1yd}{36\,\cancel{in}} = \frac{142}{36}\,yd = \frac{71}{18}\,yd = 3\frac{17}{18}\,yd = 3.9\,yd$$

3. Solution:

$17.5\,yd = \_\_\_\,ft$

$$17.5\,\cancel{yd} \times \frac{3\,ft}{1\,\cancel{yd}} = 52.5\,ft$$

4. Solution:

$11.25\,yd = \_\_\_\,in$

$$11.25\,\cancel{yd} \times \frac{36in}{1\,\cancel{yd}} = 405in$$

5. Solution:

$322\,ft = \_\_\_\,yd$

$$322\,\cancel{ft} \times \frac{1yd}{3\,\cancel{ft}} = \frac{322}{3}\,yd = 107\frac{1}{3}\,yd = 107.3\,yd$$

6. Solution:

$5.5\,yd - 24\,in = \_\_\_\_\_\,ft$

$$5.5\,\cancel{yd} \times \frac{3\,ft}{1\,\cancel{yd}} - 24\,\cancel{in} \times \frac{1\,ft}{12\,\cancel{in}} = \_\_\_\_\_\,ft$$

$$5.5\,\cancel{yd} \times \frac{3\,ft}{1\,\cancel{yd}} - \frac{24}{12}\,ft = \_\_\_\_\_\,ft$$

$16.5\,ft - 2\,ft = 14.5\,ft$

7. Solution:

$1.5\,yd + 5\,ft = \_\_\_\_\_\,in$

$1.5\,\cancel{yd} \times \frac{36in}{1\,\cancel{yd}} + 5\,\cancel{ft} \times \frac{12in}{1\,\cancel{ft}} = \_\_\_\_\,in$

$54\,in + 60\,in = 114\,in$

8. Solution:

$36\,in + 3\,ft = \_\_\_\_\_\,yd$

$36\,\cancel{in} \times \frac{1yd}{36\,\cancel{in}} + 3\,\cancel{ft} \times \frac{1yd}{3\,\cancel{ft}} = \_\_\_\_\_\,yd$

$\frac{36}{36}\,yd + \frac{3}{3}\,yd = 1yd + 1yd = 2\,yd$

9. Solution:

$3\,yd - 5\,ft = \_\_\_\_\_\,in$

$3\,\cancel{yd} \times \frac{36in}{1\,\cancel{yd}} - 5\,\cancel{ft} \times \frac{12in}{1\,\cancel{ft}} = \_\_\_\_\_\,in$

$108\,in - 60\,in = 48\,in$

10. Solution:

$4yd - 21\,in = \_\_\_\_\_\,ft$

$4\,\cancel{yd} \times \frac{3\,ft}{1\,\cancel{yd}} - 21\,\cancel{in} \times \frac{1\,ft}{12\,\cancel{in}} = \_\_\_\_\_\,ft$

$12\,ft - \frac{21}{12}\,ft = \_\_\_\_\,ft$

$12\,ft - 1.75\,ft = 10.25\,ft = 10.3\,ft$

11. Solution:

$4yd + 2\,ft - 6\,in = \_\_\_\_\_\,in$

$4\,\cancel{yd} \times \frac{36in}{1\,\cancel{yd}} + 2\,\cancel{ft} \times \frac{12in}{1\,\cancel{ft}} - 6\,in = \_\_\_\_\_\,in$

$144in + 24in - 6in = 162\,in$

12. Solution:

$5\,ft + 21in - 1.5\,yd = \_\_\_\_\_\,in$

$5\,\cancel{ft} \times \frac{12in}{1\,\cancel{ft}} + 21in - 1.5\,\cancel{yd} \times \frac{36in}{1\,\cancel{yd}} = \_\_\_\_\_\,in$

$60in + 21in - 54in = 27\,in$

13. Solution:

$5\,yd - 2.5\,ft + 66\,in = \_\_\_\_\_\,ft$

$5\,\cancel{yd} \times \frac{3\,ft}{1\,\cancel{yd}} - 2.5\,ft + 66\,\cancel{in} \times \frac{1\,ft}{12\,\cancel{in}} = \_\_\_\_\_\,ft$

$5\,\cancel{yd} \times \frac{3\,ft}{1\,\cancel{yd}} - 2.5\,ft + 66\,\cancel{in} \times \frac{1\,ft}{12\,\cancel{in}} = \_\_\_\_\_\,ft$

$15\,ft - 2.5\,ft + \frac{66}{12}\,ft$

$12.5\,ft + 5.5\,ft = 18\,ft$

14. Solution:

$1.5yd + 33in + 6\,ft = \_\_\_\_\_\,yd$

$1.5yd + 33\,\cancel{in} \times \frac{1yd}{36\,\cancel{in}} + 6\,\cancel{ft} \times \frac{1yd}{3\,\cancel{ft}} = \_\_\_\_\_\,yd$

$1.5yd + \frac{33}{36}\,yd + 6yd = \_\_\_\_\_\,yd$

$1.5\,yd + 0.91\overline{6}\,yd + 2\,yd = 4.41\overline{6}\,yd = 4.4\,yd$

15. Solution:

$7.5yd - 54\,in - 2.75\,ft = \_\_\_\_\_\,ft$

$7.5\,\cancel{yd} \times \frac{3\,ft}{1\,\cancel{yd}} - 54\,\cancel{in} \times \frac{1\,ft}{12\,\cancel{in}} - 2.75\,ft = \_\_\_\_\_\,ft$

$22.5\,ft - \frac{54}{12}\,ft - 2.75\,ft = \_\_\_\_\_\,ft$

$22.5\,ft - 4.5\,ft - 2.75\,ft = 15.25\,ft = 15.3\,ft$

Practice Section C

1. Solution:

$$36\overline{)89}\qquad 12\overline{)17}$$

$$\underline{-72} = 2\,yd\,,\quad \underline{-12} = 1\,ft\,,\text{ and } 5\,in$$
$$17 \qquad\qquad 5$$

= 2 yd + 1 ft + 5 in

2. Solution:

$$3yd + 0.875\,\cancel{yd} \times \frac{3\,ft}{1\,\cancel{yd}} = 2.625\,ft = 2\,ft + 0.625\,\cancel{ft} \times \frac{12in}{1\,\cancel{ft}} = 7.5\,in$$

= 3 yd + 2 ft + 7.5 in

3. Solution:

$$\frac{34\,in}{0.25} + \frac{5}{2}\,ft \times 3 - 1.25\,yd = \_\_\_\_\_\ ft$$

$$136in + 2.5\,ft \times 3 - 1.25\,yd = \_\_\_\_\_\ ft$$

$$136\,\cancel{in} \times \frac{1\,ft}{12\,\cancel{in}} + 2.5\,ft \times 3 - 1.25\,\cancel{yd} \times \frac{3\,ft}{1\,\cancel{yd}} = \_\_\_\_\_\ ft$$

$$11.\bar{3} + 7.5\,ft - 3.75\,ft = 22.58\bar{3}\,ft = 22.6\,ft$$

4. Solution:

$$(7.5\,yd - 54\,in - 2.75\,ft) - (1.5\,yd - 15\,in + 1.75\,ft) = \_\_\_\_\_\ ft$$

$$\left(7.5\,\cancel{yd} \times \frac{3\,ft}{1\,\cancel{yd}} - 54\,\cancel{in} \times \frac{1\,ft}{12\,\cancel{in}} - 2.75\,ft\right) - \left(1.5\,\cancel{yd} \times \frac{3\,ft}{1\,\cancel{yd}} - 15\,\cancel{in} \times \frac{1\,ft}{12\,\cancel{in}} + 1.75\,ft\right) = \_\_\_\_\_\ ft$$

$$\left(22.5\,ft - 4.5\,ft - 2.75\,ft\right) - \left(4.5\,ft - \frac{15}{12}\,ft + 1.75\,ft\right) = \_\_\_\_\_\ ft$$

$$(15.25\,ft) - (4.5\,ft - 1.25\,ft + 1.75\,ft) = \_\_\_\_\ ft$$

$$15.25\,ft - 5\,ft = 10.25\,ft = 10.3\,ft$$

5. Solution:

$$(4.5yd - 119in) + 1ft - \left(\frac{1.5ft}{0.5} - 42in - 1.125yd \div \frac{1}{4}\right) = \_\_\_\_\_\ yd$$

$$(4.5yd - 119in) + 1ft - \left(\frac{1.5ft}{0.5} - 42in - 1.125yd \div \frac{1}{4}\right) = \_\_\_\_\_\ yd$$

$$\left(4.5yd - 119\cancel{in} \times \frac{1yd}{36\cancel{in}}\right) + 1\cancel{ft} \times \frac{1yd}{3\cancel{ft}} - \left(3ft - 42\cancel{in} \times \frac{1yd}{36\cancel{in}} - 4.5yd\right) = \_\_\_\_\_\ yd$$

$$\left(4.5yd - 3.30\overline{5}\right) + 0.\overline{3}yd - \left(3\cancel{ft} \times \frac{1yd}{3\cancel{ft}} - 1.1\overline{6}\,yd - 4.5yd\right) = \_\_\_\_\_\ yd$$

$$1.19\overline{4}yd + 0.\overline{3}yd - \left(1yd - 1.1\overline{6}\,yd - 4.5yd\right) = \_\_\_\_\_\ yd$$

$$1.19\overline{4}yd + 0.\overline{3}yd - \left(1yd - 1.1\overline{6}\,yd - 4.5yd\right) = \_\_\_\_\_\ yd$$

$$1.19\overline{4}yd + 0.\overline{3}yd - \left(-4.\overline{6}\right) = \_\_\_\_\_\ yd$$

$$1.19\overline{4}yd + 0.\overline{3}yd + 4.\overline{6} = 6.194\,yd = 6.2\,yd$$

Practice Section D

1. Solution:

One error is in line 2 where $1yd = 12in$ instead of $1yd = 36in$. In line 4, the incorrect order of operations is performed when $21 - 1.5$ is calculated before 1.5×12.

The correct solution is:

$$6\ ft + 41in - 2.5\ yd = \_\_\_\_\_\ in$$

$$6\cancel{ft} \times \frac{12in}{1\cancel{ft}} + 41in - 2.5\cancel{yd} \times \frac{36in}{1\cancel{yd}} = \_\_\_\_\_\ in$$

$$72in + 41in - 2.5\cancel{yd} \times \frac{36in}{1\cancel{yd}} = \_\_\_\_\_\ in$$

$$113in - 90in = \_\_\_\_\_\ in$$

$$= 23in$$

Practice Section E

A repeating quotient is evident as soon as the numbers start repeating. In the example below the arrows on the 80's and the 30's indicate the repeating pattern in the quotient because the subtraction will always give those numbers.

$$
\begin{array}{r}
0.2727 \\
11\overline{)3.0000} \\
-22 \\
\hline
80 \\
-77 \\
\hline
30 \\
-22 \\
\hline
80 \Leftarrow \\
-77 \\
\hline
30 \Leftarrow
\end{array}
$$

You have to ensure sufficient division has been done to reveal the correct repetition. Look at this one:

$$
\begin{array}{r}
0.272 \\
3333\overline{)907.0000} \\
-6666 \\
\hline
24040 \\
-23331 \\
\hline
7090 \\
-6666
\end{array}
$$

It might appear that the repetition in this question is 0.272727…. as in the previous example, but going a little further with the division:

$$
\begin{array}{r}
0.2721 \\
3333\overline{)907.0000} \Leftarrow \\
-6666 \\
\hline
24040 \\
-23331 \\
\hline
7090 \\
-6666 \\
\hline
4240 \\
-3333 \\
\hline
907 \Leftarrow
\end{array}
$$

Now we are definitely back at the beginning because the subtraction (4240-3333) yields the same number as the radicand in the question: 907 (refer to the $\Leftarrow$'s).

Notice that we also could have stopped dividing in the first example sooner. Stopping when the 'subtraction' gives a result that is the same as the radicand in the question such as:

$$
\begin{array}{r}
0.272 \\
11\overline{)3.000} \Leftarrow \\
-22 \\
\hline
80 \\
-77 \\
\hline
3 \Leftarrow
\end{array}
$$