

# NUMERACY:

## The Basics Workbook



### Set F: Mixed & Improper Fractions

Companion Workbook to Numeracy: The Basics Video Series

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## INTRODUCTION

### What is Numeracy: The Basics Workbook?

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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](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

**MIXED & IMPROPER FRACTIONS**

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

**Practice Section A**

Change each of the following fractions from mixed to improper OR from improper to mixed fractions.

**Mixed to Improper**

1.  $1\frac{1}{2} = \underline{\hspace{2cm}}$

2.  $1\frac{5}{8} = \underline{\hspace{2cm}}$

3.  $1\frac{7}{16} = \underline{\hspace{2cm}}$

4.  $1\frac{3}{4} = \underline{\hspace{2cm}}$

5.  $2\frac{7}{8} = \underline{\hspace{2cm}}$

6.  $2\frac{1}{2} = \underline{\hspace{2cm}}$

7.  $2\frac{5}{8} = \underline{\hspace{2cm}}$

8.  $1\frac{11}{32} = \underline{\hspace{2cm}}$

9.  $2\frac{1}{4} = \underline{\hspace{2cm}}$

10.  $2\frac{9}{16} = \underline{\hspace{2cm}}$

**Improper to Mixed**

16.  $\frac{5}{2} = \underline{\hspace{2cm}}$

17.  $\frac{6}{4} = \underline{\hspace{2cm}}$

18.  $\frac{9}{4} = \underline{\hspace{2cm}}$

19.  $\frac{3}{2} = \underline{\hspace{2cm}}$

20.  $\frac{13}{8} = \underline{\hspace{2cm}}$

21.  $\frac{11}{4} = \underline{\hspace{2cm}}$

22.  $\frac{7}{4} = \underline{\hspace{2cm}}$

23.  $\frac{13}{2} = \underline{\hspace{2cm}}$

24.  $\frac{19}{16} = \underline{\hspace{2cm}}$

25.  $\frac{9}{2} = \underline{\hspace{2cm}}$



11.  $2\frac{5}{32} = \underline{\hspace{2cm}}$

26.  $\frac{19}{4} = \underline{\hspace{2cm}}$

12.  $3\frac{3}{4} = \underline{\hspace{2cm}}$

27.  $\frac{11}{2} = \underline{\hspace{2cm}}$

13.  $1\frac{11}{16} = \underline{\hspace{2cm}}$

28.  $\frac{25}{16} = \underline{\hspace{2cm}}$

14.  $2\frac{3}{16} = \underline{\hspace{2cm}}$

29.  $\frac{15}{8} = \underline{\hspace{2cm}}$

15.  $2\frac{1}{8} = \underline{\hspace{2cm}}$

30.  $\frac{19}{8} = \underline{\hspace{2cm}}$

**Practice Section B**

Change each of the following fractions from mixed to improper OR from improper to mixed fractions.

**Mixed to Improper**

1.  $2\frac{3}{4} = \underline{\hspace{2cm}}$

2.  $3\frac{1}{8} = \underline{\hspace{2cm}}$

3.  $2\frac{5}{16} = \underline{\hspace{2cm}}$

4.  $1\frac{9}{32} = \underline{\hspace{2cm}}$

5.  $3\frac{7}{16} = \underline{\hspace{2cm}}$

6.  $3\frac{1}{4} = \underline{\hspace{2cm}}$

**Improper to Mixed**

16.  $\frac{21}{16} = \underline{\hspace{2cm}}$

17.  $\frac{27}{8} = \underline{\hspace{2cm}}$

18.  $\frac{31}{4} = \underline{\hspace{2cm}}$

19.  $\frac{29}{2} = \underline{\hspace{2cm}}$

20.  $\frac{39}{16} = \underline{\hspace{2cm}}$

21.  $\frac{26}{8} = \underline{\hspace{2cm}}$



7.  $2\frac{11}{16} = \underline{\hspace{2cm}}$

8.  $3\frac{7}{8} = \underline{\hspace{2cm}}$

9.  $4\frac{3}{16} = \underline{\hspace{2cm}}$

10.  $3\frac{9}{32} = \underline{\hspace{2cm}}$

11.  $4\frac{13}{16} = \underline{\hspace{2cm}}$

12.  $5\frac{7}{8} = \underline{\hspace{2cm}}$

13.  $3\frac{31}{32} = \underline{\hspace{2cm}}$

14.  $6\frac{3}{8} = \underline{\hspace{2cm}}$

15.  $5\frac{9}{32} = \underline{\hspace{2cm}}$

22.  $\frac{60}{32} = \underline{\hspace{2cm}}$

23.  $\frac{29}{4} = \underline{\hspace{2cm}}$

24.  $\frac{43}{16} = \underline{\hspace{2cm}}$

25.  $\frac{47}{32} = \underline{\hspace{2cm}}$

26.  $\frac{37}{8} = \underline{\hspace{2cm}}$

27.  $\frac{41}{4} = \underline{\hspace{2cm}}$

28.  $\frac{52}{4} = \underline{\hspace{2cm}}$

29.  $\frac{111}{8} = \underline{\hspace{2cm}}$

30.  $\frac{194}{16} = \underline{\hspace{2cm}}$

**Practice Section C**

Change each of the following fractions from mixed to improper OR from improper to mixed fractions.

**Mixed to Improper**

1.  $5\frac{15}{16} = \underline{\hspace{2cm}}$

2.  $4\frac{31}{32} = \underline{\hspace{2cm}}$

3.  $9\frac{17}{64} = \underline{\hspace{2cm}}$

4.  $4\frac{1}{8} + 3 = \underline{\hspace{2cm}}$

5.  $4\frac{9}{32} - 2 = \underline{\hspace{2cm}}$

**Improper to Mixed**

6.  $\frac{189}{8} = \underline{\hspace{2cm}}$

7.  $\frac{129}{2} = \underline{\hspace{2cm}}$

8.  $\frac{517}{32} = \underline{\hspace{2cm}}$

9.  $\frac{309}{4} = \underline{\hspace{2cm}}$

10.  $\frac{4989}{16} = \underline{\hspace{2cm}}$

**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. Convert  $4\frac{17}{32}$  to an improper fraction.

Solution:

$$\begin{aligned} &4\frac{17}{32} \\ &= \frac{32 + 4 + 17}{32} \\ &= \frac{53}{32} \end{aligned}$$



2. Convert  $\frac{163}{4}$  to a mixed fraction.

Solution:

$$\begin{array}{r} 40 \\ 4 \overline{) 163} \\ \underline{-160} \\ 3 \end{array} = 4\frac{3}{40}$$

### Practice Section E

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

Calculate the answer by performing the correct order of operations. Give your answer in lowest terms.

1. Convert the mixed fraction  $81\frac{103}{64}$  into an improper fraction.

= \_\_\_\_\_

2. Convert  $\frac{69735}{125}$  to a mixed fraction.

= \_\_\_\_\_





# SOLUTIONS

## Set F

### Mixed & Improper Fractions

**Practice Section A**

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1. Solution:  
$$= \frac{2 \times 1 + 1}{2}$$
$$= \frac{3}{2}$$

2. Solution:  
$$= \frac{8 \times 1 + 5}{8}$$
$$= \frac{13}{8}$$

3. Solution:  
$$= \frac{16 \times 1 + 7}{16}$$
$$= \frac{23}{16}$$

4. Solution:  
$$= \frac{4 \times 1 + 3}{4}$$
$$= \frac{7}{4}$$

5. Solution:  
$$= \frac{8 \times 2 + 7}{8}$$
$$= \frac{23}{8}$$

6. Solution:  
$$= \frac{2 \times 2 + 1}{2}$$
$$= \frac{5}{2}$$

16. Solution:  
$$2 \overline{) 5} = 2 \frac{1}{2}$$
$$\begin{array}{r} 2 \overline{) 5} \\ \underline{-4} \\ 1 \end{array}$$

17. Solution:  
$$4 \overline{) 6} = 1 \frac{2}{4} = 1 \frac{1}{2}$$
$$\begin{array}{r} 4 \overline{) 6} \\ \underline{-4} \\ 2 \end{array}$$

18. Solution:  
$$4 \overline{) 9} = 2 \frac{1}{4}$$
$$\begin{array}{r} 4 \overline{) 9} \\ \underline{-8} \\ 1 \end{array}$$

19. Solution:  
$$2 \overline{) 3} = 1 \frac{1}{2}$$
$$\begin{array}{r} 2 \overline{) 3} \\ \underline{-2} \\ 1 \end{array}$$

20. Solution:  
$$8 \overline{) 13} = 1 \frac{5}{8}$$
$$\begin{array}{r} 8 \overline{) 13} \\ \underline{-8} \\ 5 \end{array}$$

21. Solution:  
$$4 \overline{) 11} = 2 \frac{3}{4}$$
$$\begin{array}{r} 4 \overline{) 11} \\ \underline{-8} \\ 3 \end{array}$$



7. Solution:

$$= \frac{8 \times 2 + 5}{8}$$
$$= \frac{21}{8}$$

8. Solution:

$$= \frac{32 \times 1 + 11}{32}$$
$$= \frac{43}{32}$$

9. Solution:

$$= \frac{4 \times 2 + 1}{4}$$
$$= \frac{9}{4}$$

10. Solution:

$$= \frac{16 \times 2 + 9}{16}$$
$$= \frac{41}{16}$$

11. Solution:

$$= \frac{32 \times 2 + 5}{32}$$
$$= \frac{69}{32}$$

12. Solution:

$$= \frac{4 \times 3 + 3}{4}$$
$$= \frac{15}{4}$$

22. Solution:

$$4 \overline{) 7} = 1 \frac{3}{4}$$
$$\begin{array}{r} 4 \overline{) 7} \\ \underline{-4} \\ 3 \end{array}$$

23. Solution:

$$2 \overline{) 13} = 6 \frac{1}{2}$$
$$\begin{array}{r} 2 \overline{) 13} \\ \underline{-12} \\ 1 \end{array}$$

24. Solution:

$$16 \overline{) 19} = 1 \frac{3}{16}$$
$$\begin{array}{r} 16 \overline{) 19} \\ \underline{-16} \\ 3 \end{array}$$

25. Solution:

$$2 \overline{) 9} = 4 \frac{1}{2}$$
$$\begin{array}{r} 2 \overline{) 9} \\ \underline{-8} \\ 1 \end{array}$$

26. Solution:

$$4 \overline{) 19} = 4 \frac{3}{4}$$
$$\begin{array}{r} 4 \overline{) 19} \\ \underline{-16} \\ 3 \end{array}$$

27. Solution:

$$2 \overline{) 11} = 5 \frac{1}{2}$$
$$\begin{array}{r} 2 \overline{) 11} \\ \underline{-10} \\ 1 \end{array}$$



13. Solution:

$$= \frac{16 \times 1 + 11}{16}$$
$$= \frac{27}{16}$$

14. Solution:

$$= \frac{16 \times 2 + 3}{16}$$
$$= \frac{35}{16}$$

15. Solution:

$$= \frac{8 \times 2 + 1}{8}$$
$$= \frac{17}{8}$$

28. Solution:

$$16 \overline{) 25} = 1 \frac{9}{16}$$
$$\begin{array}{r} 16 \overline{) 25} \\ \underline{-16} \\ 9 \end{array}$$

29. Solution:

$$8 \overline{) 15} = 1 \frac{7}{8}$$
$$\begin{array}{r} 8 \overline{) 15} \\ \underline{-8} \\ 7 \end{array}$$

30. Solution:

$$8 \overline{) 19} = 2 \frac{3}{8}$$
$$\begin{array}{r} 8 \overline{) 19} \\ \underline{-16} \\ 3 \end{array}$$

### Practice Section B

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1. Solution:

$$= \frac{4 \times 2 + 3}{4}$$
$$= \frac{11}{4}$$

2. Solution:

$$= \frac{8 \times 3 + 1}{8}$$
$$= \frac{25}{8}$$

3. Solution:

$$= \frac{16 \times 2 + 5}{16}$$
$$= \frac{37}{16}$$

16. Solution:

$$16 \overline{) 21} = 1 \frac{5}{16}$$
$$\begin{array}{r} 16 \overline{) 21} \\ \underline{-16} \\ 5 \end{array}$$

17. Solution:

$$8 \overline{) 27} = 3 \frac{3}{8}$$
$$\begin{array}{r} 8 \overline{) 27} \\ \underline{-24} \\ 3 \end{array}$$

18. Solution:

$$4 \overline{) 31} = 7 \frac{3}{4}$$
$$\begin{array}{r} 4 \overline{) 31} \\ \underline{-28} \\ 3 \end{array}$$



4. Solution:

$$= \frac{32 \times 1 + 9}{32}$$
$$= \frac{41}{32}$$

5. Solution:

$$= \frac{16 \times 3 + 7}{16}$$
$$= \frac{55}{16}$$

6. Solution:

$$= \frac{4 \times 3 + 1}{4}$$
$$= \frac{13}{4}$$

7. Solution:

$$= \frac{16 \times 2 + 11}{16}$$
$$= \frac{43}{16}$$

8. Solution:

$$= \frac{8 \times 3 + 7}{8}$$
$$= \frac{31}{8}$$

9. Solution:

$$= \frac{16 \times 4 + 3}{16}$$
$$= \frac{67}{16}$$

19. Solution:

$$2 \overline{) \frac{14}{29}} = 14 \frac{1}{2}$$
$$\underline{-28}$$
$$1$$

20. Solution:

$$16 \overline{) \frac{2}{39}} = 2 \frac{7}{16}$$
$$\underline{-32}$$
$$7$$

21. Solution:

$$8 \overline{) \frac{3}{26}} = 3 \frac{2}{8} = 3 \frac{1}{4}$$
$$\underline{-24}$$
$$2$$

22. Solution:

$$32 \overline{) \frac{1}{60}} = 1 \frac{28}{32} = 1 \frac{7}{8}$$
$$\underline{-32}$$
$$28$$

23. Solution:

$$4 \overline{) \frac{7}{29}} = 7 \frac{1}{4}$$
$$\underline{-28}$$
$$1$$

24. Solution:

$$16 \overline{) \frac{2}{43}} = 2 \frac{11}{16}$$
$$\underline{-32}$$
$$11$$

**10.** Solution:

$$\begin{aligned} &= \frac{32 \times 3 + 9}{32} \\ &= \frac{105}{32} \end{aligned}$$

**11.** Solution:

$$\begin{aligned} &= \frac{16 \times 4 + 13}{16} \\ &= \frac{77}{16} \end{aligned}$$

**12.** Solution:

$$\begin{aligned} &= \frac{8 \times 5 + 7}{8} \\ &= \frac{47}{8} \end{aligned}$$

**13.** Solution:

$$\begin{aligned} &= \frac{32 \times 3 + 31}{32} \\ &= \frac{127}{32} \end{aligned}$$

**14.** Solution:

$$\begin{aligned} &= \frac{8 \times 6 + 3}{8} \\ &= \frac{51}{8} \end{aligned}$$

**15.** Solution:

$$\begin{aligned} &= \frac{32 \times 5 + 9}{32} \\ &= \frac{169}{32} \end{aligned}$$

**25.** Solution:

$$\begin{array}{r} 32 \overline{) 47} \\ \underline{-32} \\ 15 \end{array} = 1 \frac{15}{32}$$

**26.** Solution:

$$\begin{array}{r} 8 \overline{) 37} \\ \underline{-32} \\ 5 \end{array} = 4 \frac{5}{8}$$

**27.** Solution:

$$\begin{array}{r} 4 \overline{) 41} \\ \underline{-40} \\ 1 \end{array} = 10 \frac{1}{4}$$

**28.** Solution:

$$\begin{array}{r} 4 \overline{) 52} \\ \underline{-52} \\ 0 \end{array} = 13 \frac{0}{4} = 13$$

**29.** Solution:

$$\begin{array}{r} 8 \overline{) 111} \\ \underline{-104} \\ 7 \end{array} = 13 \frac{7}{8}$$

**30.** Solution:

$$\begin{array}{r} 16 \overline{) 194} \\ \underline{-192} \\ 2 \end{array} = 12 \frac{2}{16} = 12 \frac{1}{8}$$

**Practice Section C**

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1. Solution:

$$= \frac{16 \times 5 + 15}{16}$$
$$= \frac{95}{16}$$

2. Solution:

$$= \frac{32 \times 4 + 31}{32}$$
$$= \frac{159}{32}$$

3. Solution:

$$= \frac{64 \times 9 + 17}{64}$$
$$= \frac{593}{64}$$

4. Solution:

$$= \frac{8 \times 4 + 1}{8} + 3$$
$$= \frac{33}{8} + \frac{3}{1}$$
$$= \frac{33}{8} + \left(\frac{8}{8}\right)\frac{3}{1}$$
$$= \frac{33}{8} + \frac{24}{8}$$
$$= \frac{57}{8}$$

6. Solution:

$$\begin{array}{r} 23 \\ 8 \overline{) 189} \\ \underline{-184} \\ 5 \end{array} = 23\frac{5}{8}$$

7. Solution:

$$\begin{array}{r} 64 \\ 2 \overline{) 129} \\ \underline{-128} \\ 1 \end{array} = 64\frac{1}{2}$$

8. Solution:

$$\begin{array}{r} 16 \\ 32 \overline{) 517} \\ \underline{-512} \\ 5 \end{array} = 16\frac{5}{32}$$

9. Solution:

$$\begin{array}{r} 77 \\ 4 \overline{) 309} \\ \underline{-308} \\ 1 \end{array} = 77\frac{1}{4}$$



5.

Solution:

$$\begin{aligned} &= \frac{32 \times 4 + 9}{32} - 2 \\ &= \frac{137}{32} - \frac{2}{1} \\ &= \frac{137}{32} - \left(\frac{32}{32}\right)\frac{2}{1} \\ &= \frac{137}{32} - \frac{64}{32} \\ &= \frac{73}{32} \end{aligned}$$

10.

Solution:

$$\begin{array}{r} 311 \\ 16 \overline{) 4989} \\ \underline{-4976} \\ 13 \end{array} = 311\frac{13}{16}$$

### Practice Session D

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1. Solution:

The error occurs in the numerator. All the numbers are added, where as 32 should be multiplied by 4.

The correct solution is:

$$\begin{aligned} &4\frac{17}{32} \\ &= \frac{32 \times 4 + 17}{32} \\ &= \frac{128 + 17}{32} \\ &= \frac{145}{32} \end{aligned}$$

2. Solution:

The error is made converting the work from the long division to a mixed fraction. The fraction (or answer in this case) should be  $40\frac{3}{4}$  rather than  $4\frac{3}{40}$  because the divisor is 4, not 40. Or, in other words, the denominator of the original fraction is 4 and not 40.



**Practice Session E**

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1. Solution:

$$\begin{aligned} & 81\frac{103}{64} \\ &= \frac{64 \times 81 + 103}{64} \\ &= \frac{5184 + 103}{64} \\ &= \frac{5287}{64} \end{aligned}$$

2. Solution:

$$\begin{array}{r} \phantom{125} \overline{) 69735} \\ \underline{-625} \phantom{0} \\ \phantom{125} 723 \phantom{0} \\ \underline{-625} \phantom{0} \\ \phantom{125} 985 \phantom{0} \\ \underline{-875} \phantom{0} \\ \phantom{125} 110 \phantom{0} \end{array} \quad = 557\frac{110}{125} = 557\frac{22}{25}$$