

NUMERACY:

The Basics Workbook



Set M: Order of Operations & 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



ORDER OF OPERATIONS & 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. Calculate the answer for each question, following the correct order of operations and 'rules' for adding, subtracting, multiplying and dividing decimals.

1. $1.5 + 2.5 \times 2 = \underline{\hspace{2cm}}$

2. $7.5 \div 1.5 + 5 = \underline{\hspace{2cm}}$

3. $2 \times 7.5 - 5 = \underline{\hspace{2cm}}$

4. $9 \div 4 \times 3.3 = \underline{\hspace{2cm}}$

5. $9.2 \div 2.3 - 1.9 = \underline{\hspace{2cm}}$

6. $9.6 - 6.4 \div 1.6 = \underline{\hspace{2cm}}$

7. $9.6 \times 6.4 - 11.8 = \underline{\hspace{2cm}}$

8. $3.1 \div 0.5 + 4.6 = \underline{\hspace{2cm}}$

9. $1.7 \times 2.3 - 1.8 = \underline{\hspace{2cm}}$

10. $3.4 \div 1.7 + 2.3 = \underline{\hspace{2cm}}$

11. $2.5 \times (5.3 - 3.3) = \underline{\hspace{2cm}}$

12. $2.5 \times (2.1 + 1.4) = \underline{\hspace{2cm}}$

13. $1.74 \times (6.8 - 1.45) = \underline{\hspace{2cm}}$

14. $6.57 \div (8.37 - 1.8) = \underline{\hspace{2cm}}$

15. $1.5 + 2.5 + 6.4 \div 1.6 = \underline{\hspace{2cm}}$

**Practice Section B**

Calculate the following. Calculate the answer for each question, following the correct order of operations and 'rules' for adding, subtracting, multiplying and dividing decimals.

1. $2.05 \times (3.7 + 0.08) = \underline{\hspace{2cm}}$
2. $(4.25 \times 4 - 7) \div 2.5 = \underline{\hspace{2cm}}$
3. $5.30 \div (5.41 - 2.76) = \underline{\hspace{2cm}}$
4. $8.2 + 2.5 \div 5 \times 2.5 = \underline{\hspace{2cm}}$
5. $6.4 \div 0.8 \times (1.5 + 3) = \underline{\hspace{2cm}}$
6. $3.5 \times 2.5 - 8.4 \div 2.1 = \underline{\hspace{2cm}}$
7. $4.5 \times 1.8 \div 0.9 \div 3 + 6 = \underline{\hspace{2cm}}$
8. $4.5 \times 1.8 \div 0.9 \div (3 + 6) = \underline{\hspace{2cm}}$
9. $2.1 \times (3.1 + 4.5) \div 2.5 = \underline{\hspace{2cm}}$
10. $9.2 \div 1.6 + 6.3 \div 1.8 = \underline{\hspace{2cm}}$
11. $4.6 \div 1.15 + (3 \times 2.5 - 1.5) = \underline{\hspace{2cm}}$
12. $7.125 + 2.3 \times 5.75 + 8.75 - 4.208 = \underline{\hspace{2cm}}$
13. $(16.52 - 3.02) - 2 \times 5.75 + (2.3 - 1.8) = \underline{\hspace{2cm}}$
14. $2.1 \times (4.6 \div 1.15) + (8 \times 2.5 - 4.5) = \underline{\hspace{2cm}}$
15. $4.5 \times 4.5 \div (9.008 - 2 \times 3.004) \div 1.8 = \underline{\hspace{2cm}}$

**Practice Section C**

Calculate the answer for each question, following the correct order of operations and 'rules' for adding, subtracting, multiplying and dividing decimals. Stop dividing if you get more than 5 decimal places in your answer.

1. $8.4 \div 4 \div (13.675 - 3.2 \times 1.65 + 2.105) =$ _____

2. $3.5 \times 3.5 - 8.4 \div 2.1 \div 3.2 \div 0.5 + 4.6 =$ _____

3. $25.596 \div (1.6 + 6.3) \div [1.8 \times 5.30 - (2.76 - 5.79)] =$ _____

4. $2.1 \times [(3.1 + 4.5) \div 2.5 + 4.6] \div 1.6 - [(3 \times 2.5 - 1.5) - 2.1 \times 0.125] =$ _____

5. $8.125 \times [8.703 \times (0.9 \div 3 + 0.2) + 6] - [8.2 + 2.5 \div 5 \times (2.5 + 2)] =$ _____

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.

$$\begin{aligned} &8.2 + 2.5 \div 5 \times 2.5 \\ &= 10.7 \div 5 \times 2.5 \\ &= 2.14 \times 2.5 \\ &= 4.64 \end{aligned}$$

$$= \text{_____}$$

**Practice Section E**

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

$$[9.2 - (2.76 - 5.79) \div (1.6 + 6.3)] \div 1.8 \times 5.30 \div [2.1 \times (3.1 + 4.5) \div 2.5 + (4.25 \times 4 - 7) \div 2.5] + 9.6 \times 6.4 - 11.8$$

= _____



SOLUTIONS

Set M

Order of Operations & Decimals

**ORDER OF OPERATIONS & DECIMALS****Practice Section A**

1. Solution:
 $1.5 + 2.5 \times 2$
 $= 1.5 + 2.5 \times 2$
 $= 1.5 + 5$
 $= 6.5$

2. Solution:
 $7.5 \div 1.5 + 5$
 $= 5 + 5$
 $= 10$

3. Solution:
 $2 \times 7.5 - 5$
 $= 15 - 5$
 $= 10$

4. Solution:
 $9 \div 4 \times 3.3$
 $= 2.25 \times 3.3$
 $= 7.425$

5. Solution:
 $9.2 \div 2.3 - 1.9$
 $= 9.2 \div 2.3 - 1.9$
 $= 4 - 1.9$
 $= 2.1$

6. Solution:
 $9.6 - 6.4 \div 1.6$
 $= 9.6 - 4$
 $= 5.6$

7. Solution:
 $9.6 \times 6.4 - 11.8$
 $= 61.44 - 11.8$
 $= 49.64$

8. Solution:
 $3.1 \div 0.5 + 4.6$
 $= 6.2 + 4.6$
 $= 10.8$

9. Solution:
 $1.7 \times 2.3 - 1.8$
 $= 3.91 - 1.8$
 $= 2.11$

10. Solution:
 $3.4 \div 1.7 + 2.3$
 $= 2 + 2.3$
 $= 4.3$



11. Solution:
 $2.5 \times (5.3 - 3.3)$
 $= 2.5 \times 2$
 $= 5$

12. Solution:
 $2.5 \times (2.1 + 1.4)$
 $= 2.5 \times 3.5$
 $= 8.75$

13. Solution:
 $1.74 \times (6.8 - 1.45)$
 $= 1.74 \times 5.35$
 $= 9.309$

14. Solution:
 $6.57 \div (8.37 - 1.8)$
 $= 6.57 \div 6.57$
 $= 1$

15. Solution:
 $1.5 + 2.5 + 6.4 \div 1.6$
 $= 1.5 + 2.5 + 4$
 $= 4 + 4$
 $= 8$

Practice Section B

1. Solution:
 $2.05 \times (3.7 + 0.08)$
 $= 2.05 \times 3.78$
 $= 7.749$

2. Solution:
 $(4.25 \times 4 - 7) \div 2.5$
 $= (17 - 7) \div 2.5$
 $= 10 \div 2.5$
 $= 4$

3. Solution:
 $5.30 \div (5.41 - 2.76)$
 $= 5.30 \div 2.65$
 $= 2$

4. Solution:
 $8.2 + 2.5 \div 5 \times 2.5$
 $= 8.2 + 0.5 \times 2.5$
 $= 8.2 + 1.25$
 $= 9.45$

5. Solution:
 $6.4 \div 0.8 \times (1.5 + 3)$
 $= 6.4 \div 0.8 \times 4.5$
 $= 8 \times 4.5$
 $= 36$

6. Solution:
 $3.5 \times 2.5 - 8.4 \div 2.1$
 $= 8.75 - 8.4 \div 2.1$
 $= 8.75 - 4$
 $= 4.75$



7. Solution:
 $4.5 \times 1.8 \div 0.9 \div 3 + 6$
 $= 8.1 \div 0.9 \div 3 + 6$
 $= 9 \div 3 + 6$
 $= 3 + 6$
 $= 9$

8. Solution:
 $4.5 \times 1.8 \div 0.9 \div (3 + 6)$
 $= 4.5 \times 1.8 \div 0.9 \div 9$
 $= 8.1 \div 0.9 \div 9$
 $= 8.1 \div 0.9 \div 9$
 $= 9 \div 9$
 $= 1$

9. Solution:
 $2.1 \times (3.1 + 4.5) \div 2.5$
 $= 2.1 \times 7.6 \div 2.5$
 $= 15.96 \div 2.5$
 $= 6.384$

10. Solution:
 $9.2 \div 1.6 + 6.3 \div 1.8$
 $= 5.75 + 6.3 \div 1.8$
 $= 5.75 + 3.5$
 $= 9.25$

11. Solution:
 $4.6 \div 1.15 + (3 \times 2.5 - 1.5)$
 $= 4.6 \div 1.15 + (7.5 - 1.5)$
 $= 4.6 \div 1.15 + 6$
 $= 4 + 6$
 $= 10$

12. Solution:
 $7.125 + 2.3 \times 5.75 + 8.75 - 4.208$
 $= 7.125 + 13.225 + 8.75 - 4.208$
 $= 20.35 + 8.75 - 4.208$
 $= 29.1 - 4.208$
 $= 24.892$

13. Solution:
 $(16.52 - 3.02) - 2 \times 5.75 + (2.3 - 1.8)$
 $= 13.5 - 2 \times 5.75 + (2.3 - 1.8)$
 $= 13.5 - 11.5 + (2.3 - 1.8)$
 $= 13.5 - 11.5 + 0.5$
 $= 2 + 0.5$
 $= 2.5$

14. Solution:
 $2.1 \times (4.6 \div 1.15) + (8 \times 2.5 - 4.5)$
 $= 2.1 \times 4 + (8 \times 2.5 - 4.5)$
 $= 2.1 \times 4 + (20 - 4.5)$
 $= 2.1 \times 4 + 15.5$
 $= 8.4 + 15.5$
 $= 23.9$

15. Solution:
 $4.5 \times 4.5 \div (9.008 - 2 \times 3.004) \div 1.8$
 $= 4.5 \times 4.5 \div (9.008 - 6.008) \div 1.8$
 $= 4.5 \times 4.5 \div 3 \div 1.8$
 $= 20.25 \div 3 \div 1.8$
 $= 6.75 \div 1.8$
 $= 3.75$



Practice Section C

1. Solution:
 $8.4 \div 4 \div (13.675 - 3.2 \times 1.65 + 2.105)$
 $= 8.4 \div 4 \div (13.675 - 5.28 + 2.105)$
 $= 8.4 \div 4 \div (8.395 + 2.105)$
 $= 8.4 \div 4 \div 10.5$
 $= 2.1 \div 10.5$
 $= 0.2$
2. Solution:
 $3.5 \times 3.5 - 8.4 \div 2.1 \div 3.2 \div 0.5 + 4.6$
 $= 12.25 - 8.4 \div 2.1 \div 3.2 \div 0.5 + 4.6$
 $= 12.25 - 4 \div 3.2 \div 0.5 + 4.6$
 $= 12.25 - 1.25 \div 0.5 + 4.6$
 $= 12.25 - 2.5 + 4.6$
 $= 9.75 + 4.6$
 $= 14.35$
3. Solution:
 $25.596 \div (1.6 + 6.3) \div [1.8 \times 5.30 - (2.76 - 5.79)]$
 $= 25.596 \div 7.9 \div [1.8 \times 5.30 - (2.76 - 5.79)]$
 $= 25.596 \div 7.9 \div [1.8 \times 5.30 - (-3.03)]$
 $= 25.596 \div 7.9 \div [1.8 \times 5.30 + 3.03]$
 $= 25.596 \div 7.9 \div [9.54 + 3.03]$
 $= 25.596 \div 7.9 \div 12.57$
 $= 3.24 \div 12.57$
 $= 0.25775\dots$



4. Solution:

$$\begin{aligned} & 2.1 \times [(3.1 + 4.5) \div 2.5 + 4.6] \div 1.6 - [(3 \times 2.5 - 1.5) - 2.1 \times 0.125] \\ &= 2.1 \times [7.6 \div 2.5 + 4.6] \div 1.6 - [(7.5 - 1.5) - 2.1 \times 0.125] \\ &= 2.1 \times [3.04 + 4.6] \div 1.6 - [6 - 2.1 \times 0.125] \\ &= 2.1 \times [7.64] \div 1.6 - [6 - 0.2625] \\ &= 2.1 \times 7.64 \div 1.6 - [5.7375] \\ &= 2.1 \times 7.64 \div 1.6 - 5.7375 \\ &= 16.044 \div 1.6 - 5.7375 \\ &= 10.0275 - 5.7375 \\ &= 4.29 \end{aligned}$$

5. Solution:

$$\begin{aligned} & 8.125 \times [8.703 \times (0.9 \div 3 + 0.2) + 6] - [8.2 + 2.5 \div 5 \times (2.5 + 2)] \\ &= 8.125 \times [8.703 \times (0.3 + 0.2) + 6] - [8.2 + 2.5 \div 5 \times (4.5)] \\ &= 8.125 \times [8.703 \times 0.5 + 6] - [8.2 + 2.5 \div 5 \times 4.5] \\ &= 8.125 \times [4.3515 + 6] - [8.2 + 0.5 \times 4.5] \\ &= 8.125 \times 10.3515 - [8.2 + 2.25] \\ &= 8.125 \times 10.3515 - 10.45 \\ &= 84.1059375 - 10.45 \\ &= 73.65593... \end{aligned}$$

Practice Section D

1. Solution:

One error is in line 2 where the correct order of operations was not followed. There is a second error in line 3 where 2.14 is added to 2.5 instead of being multiplied.

The correct solution is:

$$\begin{aligned} & 8.2 + 2.5 \div 5 \times 2.5 \\ &= 8.2 + 0.5 \times 2.5 \\ &= 8.2 + 1.25 \\ &= 9.45 \end{aligned}$$



Practice Section E

Solution:

$$\begin{aligned} & [9.2 - (2.76 - 5.79) \div (1.6 + 6.3)] \div 1.8 \times 5.30 \div [2.1 \times (3.1 + 4.5) \div 2.5 + (4.25 \times 4 - 7) \div 2.5] + 9.6 \times 6.4 - 11.8 \\ & = [9.2 - (-3.03) \div (7.9)] \div 1.8 \times 5.30 \div [2.1 \times (7.6) \div 2.5 + (17 - 7) \div 2.5] + 9.6 \times 6.4 - 11.8 \\ & = [9.2 + 3.03 \div (7.9)] \div 1.8 \times 5.30 \div [2.1 \times 7.6 \div 2.5 + 10 \div 2.5] + 9.6 \times 6.4 - 11.8 \\ & = [9.2 + 0.383544] \div 1.8 \times 5.30 \div [15.96 \div 2.5 + 4] + 9.6 \times 6.4 - 11.8 \\ & = [9.2 + 0.383544] \div 1.8 \times 5.30 \div [6.384 + 4] + 9.6 \times 6.4 - 11.8 \\ & = 9.583544 \div 1.8 \times 5.30 \div 10.384 + 9.6 \times 6.4 - 11.8 \\ & = 5.324191 \times 5.3 \div 10.384 + 61.44 - 11.8 \\ & = 28.2182123 \div 10.384 + 61.44 - 11.8 \\ & = 2.71747 + 61.44 - 11.8 \\ & = 64.15747 - 11.8 \\ & = 52.35747 \end{aligned}$$

Because of the nasty decimal in line 4 this answer is not exact, but it is very close.