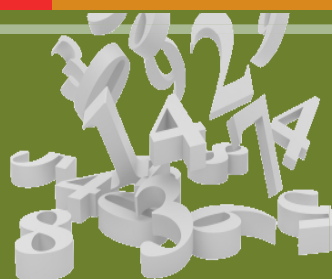# NUMERACY:
The Basics Workbook

Set A: Order of Operations 1

Companion Workbook to Numeracy: The Basics Video Series

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Education
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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 1

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

Practice Section A

Calculate the answer to each of the following questions by performing the correct order of operations.

1. $9+6-2$ = _____

2. $6 \div 2 + 1$ = _____

3. $16 \div 4 + 4$ = _____

4. $15 - 6 \div 3$ = _____

5. $10 - 6 \div 2$ = _____

6. $6 \times 4 \div 2$ = _____

7. $8 + 4 \div 2$ = _____

8. $6 \times 4 - 2$ = _____

9. $15 \div 3 - 2$ = _____

10. $2 \times 3 + 5$ = _____

11. $18 + 6 \div 2 + 4$ = _____

12. $16 \div 4 + 6 - 3$ = _____

13. $4 + 10 \div 2 - 6$ = _____

14. $2 \times 7 - 2 + 3$ = _____

15. $22 + 13 - 7 \times 3$ = _____

Practice Section B

Calculate the answer to each of the following questions by performing the correct order of operations.

1. $12+6\div 2+16$ = _____

2. $16\div 2+7\times 3$ = _____

3. $6\times 24\div 12+4$ = _____

4. $4\times 2+12\div 3$ = _____

5. $6\times 8-10\div 5$ = _____

6. $18\div 6-18\div 9$ = _____

7. $27\div 9+8\times 5$ = _____

8. $14+3\times 7-6$ = _____

9. $4+7\times 2+8\div 4$ = _____

10. $6-8\div 4+6\times 2$ = _____

11. $28\div 4-3+2\times 7$ = _____

12. $9+5\times 2-3\times 4$ = _____

13. $25\times 2-5\times 2+6$ = _____

14. $15\div 3\times 2+6\div 3$ = _____

15. $12\div 3-4+2\times 3$ = _____

16. $13-2\times 4+7\times 3$ = _____

17. $14\div 2+2\times 4+11$ = _____

18. $10\times 2-2+4\times 7-7$ = _____

19. $9+5\times 2-3\times 8\div 6$ = _____

20. $6\times 4+9\div 3-15\div 5$ = _____

Practice Section C

Calculate the answer to each of the following questions by performing the correct order of operations.

1. $17 + 24 \div 4 - 2 \times 3 + 17$ = _____

2. $39 - 2 \times 14 + 55 \div 5 - 13$ = _____

3. $72 \div 9 \times 3 + 45 \div 5 - 8$ = _____

4. $14 \times 3 - 6 + 48 \div 12 - 2 \times 7$ = _____

5. $54 \div 9 + 12 \times 5 - 30 \div 6 \times 3$ = _____

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.

$$12 \div 3 - 2 + 4 \times 3$$
$$= 12 \div 3 - 2 + 12$$
$$= 12 \div 1 + 12$$
$$= 12 + 12$$
$$= 24$$

2.

$$32 \div 4 \times 2 + 25 \div 5 + 20$$
$$= 32 \div 8 + 25 \div 5 + 20$$
$$= 4 + 25 \div 25$$
$$= 4 + 1$$
$$= 5$$

Practice Section E

Challenge Question. If you can do this one, then you get an A$^+$. ☺

Calculate the answer by performing the correct order of operations.

$$44 \div 4 \times 3 + 49 \div 7 + 2 \times 6 \div 3 + 31 - 14 \times 8 \div 7 + 9 - 27 + 3 \times 3$$

= _____

SOLUTIONS

Set A

Order of Operations 1

ORDER OF OPERATIONS 1

Practice Section A

1. Solution:

$$9 + 6 - 2 \quad or \quad 9 + 6 - 2$$
$$= 15 - 2 \qquad\qquad = 9 + 4$$
$$= 13 \qquad\qquad\quad = 13$$

2. Solution:

$$6 \div 2 + 1$$
$$= 3 + 1$$
$$= 4$$

3. Solution:

$$16 \div 4 + 4$$
$$= 4 + 4$$
$$= 8$$

4. Solution:

$$15 - 6 \div 3$$
$$= 15 - 2$$
$$= 13$$

5. Solution:

$$10 - 6 \div 2$$
$$= 10 - 3$$
$$= 7$$

6. Solution:

$$6 \times 4 \div 2 \quad or \quad 6 \times 4 \div 2$$
$$= 24 \div 2 \qquad\qquad = 6 \times 2$$
$$= 12 \qquad\qquad\quad = 12$$

7. Solution:

$$8 + 4 \div 2$$
$$= 8 + 2$$
$$= 10$$

8. Solution:

$$6 \times 4 - 2$$
$$= 24 - 2$$
$$= 22$$

9. Solution:

$$15 \div 3 - 2$$
$$= 5 - 2$$
$$= 3$$

10. Solution:

$$2 \times 3 + 5$$
$$= 6 + 5$$
$$= 11$$

11. Solution:

$$18 + 6 \div 2 + 4$$
$$= 18 + 3 + 4$$
$$= 21 + 4$$
$$= 25$$

12. Solution:

$$16 \div 4 + 6 - 3$$
$$= 4 + 6 - 3$$
$$= 10 - 3$$
$$= 7$$

13. Solution:

$$4 + 10 \div 2 - 6$$
$$= 4 + 5 - 6$$
$$= 9 - 6$$
$$= 3$$

14. Solution:

$2 \times 7 - 2 + 3$

$= 14 - 2 + 3$

$= 12 + 3$

$= 15$

15. Solution:

$22 + 13 - 7 \times 3$

$= 22 + 13 - 21$

$= 35 - 21$

$= 14$

Practice Section B

1. Solution:

$12 + 6 \div 2 + 16$

$= 12 + 3 + 16$

$= 15 + 16$

$= 31$

2. Solution:

$16 \div 2 + 7 \times 3$

$= 8 + 7 \times 3$

$= 8 + 21$

$= 29$

3. Solution:

$6 \times 24 \div 12 + 4 \quad or \quad 6 \times 24 \div 12 + 4$

$= 144 \div 12 + 4 \qquad = 6 \times 2 + 4$

$= 12 + 4 \qquad\qquad = 12 + 4$

$= 16 \qquad\qquad\quad = 16$

4. Solution:

$4 \times 2 + 12 \div 3$

$= 8 + 12 \div 3$

$= 8 + 4$

$= 12$

5. Solution:

$6 \times 8 - 10 \div 5$

$= 48 - 10 \div 5$

$= 48 - 2$

$= 46$

6. Solution:

$18 \div 6 - 18 \div 9$

$= 3 - 18 \div 9$

$= 3 - 2$

$= 1$

7. Solution:

$27 \div 9 + 8 \times 5$

$= 3 + 8 \times 5$

$= 3 + 40$

$= 43$

8. Solution:

$14 + 3 \times 7 - 6$

$= 14 + 21 - 6$

$= 35 - 6$

$= 29$

9. Solution:
$$4 + 7 \times 2 + 8 \div 4$$
$$= 4 + 14 + 8 \div 4$$
$$= 4 + 14 + 2$$
$$= 18 + 2$$
$$= 20$$

10. Solution:
$$6 - 8 \div 4 + 6 \times 2$$
$$= 6 - 2 + 6 \times 2$$
$$= 6 - 2 + 12$$
$$= 4 + 12$$
$$= 16$$

11. Solution:
$$28 \div 4 - 3 + 2 \times 7$$
$$= 7 - 3 + 2 \times 7$$
$$= 7 - 3 + 14$$
$$= 4 + 14$$
$$= 18$$

12. Solution:
$$9 + 5 \times 2 - 3 \times 4$$
$$= 9 + 10 - 3 \times 4$$
$$= 9 + 10 - 12$$
$$= 19 - 12$$
$$= 7$$

13. Solution:
$$25 \times 2 - 5 \times 2 + 6$$
$$= 50 - 5 \times 2 + 6$$
$$= 50 - 10 + 6$$
$$= 40 + 6$$
$$= 46$$

14. Solution:
$$15 \div 3 \times 2 + 6 \div 3$$
$$= 5 \times 2 + 6 \div 3$$
$$= 10 + 6 \div 3$$
$$= 10 + 2$$
$$= 12$$

15. Solution:
$$12 \div 3 - 4 + 2 \times 3$$
$$= 4 - 4 + 2 \times 3$$
$$= 4 - 4 + 6$$
$$= 0 + 6$$
$$= 6$$

16. Solution:
$$13 - 2 \times 4 + 7 \times 3$$
$$= 13 - 8 + 7 \times 3$$
$$= 13 - 8 + 21$$
$$= 5 + 21$$
$$= 26$$

17. Solution:
$$14 \div 2 + 2 \times 4 + 11$$
$$= 7 + 2 \times 4 + 11$$
$$= 7 + 8 + 11$$
$$= 15 + 11$$
$$= 26$$

18. Solution:
$$10 \times 2 - 2 + 4 \times 7 - 7$$
$$= 20 - 2 + 4 \times 7 - 7$$
$$= 20 - 2 + 28 - 7$$
$$= 18 + 28 - 7$$
$$= 46 - 7$$
$$= 39$$

19. Solution:
$$9 + 5 \times 2 - 3 \times 8 \div 6$$
$$= 9 + 10 - 3 \times 8 \div 6$$
$$= 9 + 10 - 24 \div 6$$
$$= 9 + 10 - 4$$
$$= 19 - 4$$
$$= 15$$

20. Solution:
$$6 \times 4 + 9 \div 3 - 15 \div 5$$
$$= 24 + 9 \div 3 - 15 \div 5$$
$$= 24 + 3 - 15 \div 5$$
$$= 24 + 3 - 3$$
$$= 27 - 3$$
$$= 24$$

Practice Section C

1. Solution:
$$17 + 24 \div 4 - 2 \times 3 + 17$$
$$= 17 + 6 - 2 \times 3 + 17$$
$$= 17 + 6 - 6 + 17$$
$$= 23 - 6 + 17$$
$$= 17 + 17$$
$$= 34$$

2. Solution:
$$39 - 2 \times 14 + 55 \div 5 - 13$$
$$= 39 - 28 + 55 \div 5 - 13$$
$$= 39 - 28 + 11 - 13$$
$$= 11 + 11 - 13$$
$$= 22 - 13$$
$$= 9$$

3. Solution:
$$72 \div 9 \times 3 + 45 \div 5 - 8$$
$$= 8 \times 3 + 45 \div 5 - 8$$
$$= 24 + 45 \div 5 - 8$$
$$= 24 + 9 - 8$$
$$= 33 - 8$$
$$= 25$$

4. Solution:
$$14 \times 3 - 6 + 48 \div 12 - 2 \times 7$$
$$= 42 - 6 + 48 \div 12 - 2 \times 7$$
$$= 42 - 6 + 4 - 2 \times 7$$
$$= 42 - 6 + 4 - 14$$
$$= 36 + 4 - 14$$
$$= 40 - 14$$
$$= 26$$

5. Solution:

$$54 \div 9 + 12 \times 5 - 30 \div 6 \times 3$$

$$= 6 + 12 \times 5 - 30 \div 6 \times 3$$

$$= 6 + 60 - 30 \div 6 \times 3$$

$$= 6 + 60 - 5 \times 3$$

$$= 6 + 60 - 15$$

$$= 66 - 15$$

$$= 51$$

Practice Section D

1. Solution:

Line 1 of the solution is correct. In line 2, the subtraction $3 - 2$ is performed out of order. The division and multiplication must be calculated before any addition or subtraction is done. The fact that 4×3 is calculated before $12 \div 3$ is not an error because they are not side by side. With that said, it is suggested that the multiplication/division is calculated from left to right to avoid careless errors.

The correct solution is:

$$12 \div 3 - 2 + 4 \times 3$$

$$= 4 - 2 + 4 \times 3$$

$$= 4 - 2 + 12$$

$$= 2 + 12$$

$$= 14$$

2.   Solution:

Line 1 is incorrect. Because there are two multiplication/division signs in a row, they <u>must</u> be done in order from left to right. Line 2 of the solution also has an error since the addition $5+20$ is calculated before the division $25 \div 5$.

The correct solution is:

$$32 \div 4 \times 2 + 25 \div 5 + 20$$
$$= 8 \times 2 + 25 \div 5 + 20$$
$$= 16 + 25 \div 5 + 20$$
$$= 16 + 5 + 20$$
$$= 21 + 20$$
$$= 41$$

Practice Section E

Solution:

$$44 \div 4 \times 3 + 49 \div 7 + 2 \times 6 \div 3 + 31 - 14 \times 8 \div 7 + 9 - 27 + 3 \times 3$$
$$= 11 \times 3 + 49 \div 7 + 2 \times 6 \div 3 + 31 - 14 \times 8 \div 7 + 9 - 27 + 3 \times 3$$
$$= 33 + 49 \div 7 + 2 \times 6 \div 3 + 31 - 14 \times 8 \div 7 + 9 - 27 + 3 \times 3$$
$$= 33 + 7 + 2 \times 6 \div 3 + 31 - 14 \times 8 \div 7 + 9 - 27 + 3 \times 3$$
$$= 33 + 7 + 12 \div 3 + 31 - 14 \times 8 \div 7 + 9 - 27 + 3 \times 3$$
$$= 33 + 7 + 4 + 31 - 14 \times 8 \div 7 + 9 - 27 + 3 \times 3$$
$$= 33 + 7 + 4 + 31 - 112 \div 7 + 9 - 27 + 3 \times 3$$
$$= 33 + 7 + 4 + 31 - 16 + 9 - 27 + 3 \times 3$$
$$= 33 + 7 + 4 + 31 - 16 + 9 - 27 + 9$$
$$= 40 + 4 + 31 - 16 + 9 - 27 + 9$$
$$= 44 + 31 - 16 + 9 - 27 + 9$$
$$= 75 - 16 + 9 - 27 + 9$$
$$= 59 + 9 - 27 + 9$$
$$= 68 - 27 + 9$$
$$= 41 + 9$$
$$= 50$$