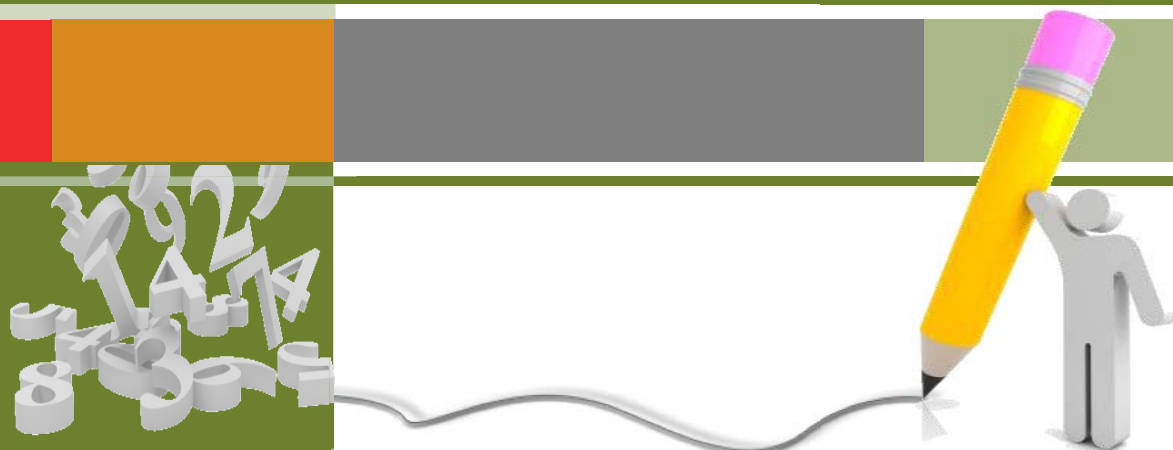


NUMERACY:

The Basics Workbook



Set E: Multiplying & Dividing Fractions

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



MULTIPLYING & DIVIDING FRACTIONS

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

Practice Section A

Calculate the following. Express your answer in lowest terms.

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

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

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

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

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

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

7. $\frac{7}{8} \times \frac{1}{4} = \underline{\hspace{2cm}}$

8. $\frac{7}{8} \div \frac{1}{4} = \underline{\hspace{2cm}}$

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

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

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



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

13. $\frac{5}{16} \times 8 = \underline{\hspace{2cm}}$

14. $\frac{5}{16} \div 8 = \underline{\hspace{2cm}}$

15. $8 \div \frac{5}{16} = \underline{\hspace{2cm}}$

16. $\frac{5}{8} \times \frac{3}{4} = \underline{\hspace{2cm}}$

17. $\frac{3}{8} \times \frac{3}{4} = \underline{\hspace{2cm}}$

18. $\frac{3}{8} \div \frac{3}{4} = \underline{\hspace{2cm}}$

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

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

21. $3 \times \frac{9}{16} = \underline{\hspace{2cm}}$

22. $3 \div \frac{9}{16} = \underline{\hspace{2cm}}$

23. $\frac{1}{2} \div \frac{7}{8} \times 4 = \underline{\hspace{2cm}}$

24. $\left(\frac{1}{2} \div \frac{7}{8}\right) \times 4 = \underline{\hspace{2cm}}$

25. $\frac{1}{2} \div \left(\frac{7}{8} \times 4\right) = \underline{\hspace{2cm}}$

**Practice Section B**

Calculate the following. Express your answer in lowest terms.

1. $\frac{1}{2} \times \frac{3}{16} \div \frac{3}{4}$

2. $\frac{1}{2} \div \frac{7}{8} \div \frac{3}{4}$

3. $\frac{9}{16} \div \frac{1}{2} \times \frac{5}{8}$

4. $\frac{3}{4} \times \frac{5}{8} \div \frac{1}{4}$

5. $\frac{3}{4} \div \frac{7}{8} \times \frac{1}{4}$

6. $\frac{13}{16} \div \frac{3}{4} \times \frac{1}{8}$

7. $\frac{15}{16} \div \frac{1}{4} \div \frac{1}{2}$

8. $\frac{3}{8} \div \frac{3}{4} \times \frac{5}{16}$

9. $\frac{3}{8} \div \frac{1}{8} \div \frac{1}{2}$

10. $\frac{9}{32} \div \frac{9}{16} \times \frac{1}{4}$

11. $\frac{11}{16} \div \frac{3}{8} \times \frac{1}{16}$

12. $\frac{3}{16} \times 4 \div \frac{1}{2}$

13. $\frac{3}{16} \div \left(\frac{1}{4} \times \frac{1}{2} \right)$



14. $\frac{3}{8} \div \left(\frac{3}{4} \times \frac{5}{16} \right)$

15. $8 \div \left(\frac{9}{16} \times \frac{1}{4} \right)$

16. $\frac{5}{16} \div \left(\frac{3}{8} \times \frac{1}{4} \right)$

17. $\frac{3}{8} \div \frac{3}{4} \div \frac{5}{32} \div \frac{1}{2}$

18. $\frac{9}{16} \times \frac{1}{2} \div \frac{3}{32} \times \frac{1}{8}$

19. $\frac{9}{16} \times \left(\frac{1}{2} \div \frac{3}{32} \right) \times \frac{1}{8}$

20. $\frac{3}{4} \div \left(\frac{3}{4} \times \frac{5}{8} \right) \div 4$

Practice Section C

Calculate the following. Express your answer in lowest terms.

1. $\frac{3}{8} - \frac{1}{16} + \frac{1}{4} + \frac{5}{8} - \frac{7}{16} - \frac{1}{4} + \frac{3}{4} + \frac{1}{8} - \frac{3}{4} + \frac{1}{32} - \frac{5}{16} + \frac{1}{4} + \frac{3}{8} - \frac{1}{2} = \underline{\hspace{2cm}}$

2. $\frac{3}{8} - \frac{1}{16} + \frac{1}{4} - \left(\frac{5}{8} - \frac{7}{16} \right) - \left(\frac{1}{4} - \frac{3}{4} \right) + \frac{1}{8} = \underline{\hspace{2cm}}$

3. $\frac{3}{8} - \left(\frac{3}{4} - \frac{1}{2} \right) + \frac{1}{16} - \left(\frac{5}{32} - \frac{7}{16} + \frac{1}{4} - \frac{3}{8} \right) = \underline{\hspace{2cm}}$

4. $\left(\frac{15}{16} - \frac{3}{4} + \frac{1}{8} \right) + \left[\frac{3}{4} - \left(\frac{3}{16} - \frac{1}{2} \right) + \frac{3}{4} - \left(\frac{1}{8} - \frac{1}{2} \right) \right] = \underline{\hspace{2cm}}$

5. $\frac{3}{4} + \left[\frac{1}{2} - \left(\frac{1}{2} + \frac{3}{8} \right) - \left(\frac{3}{4} - \frac{9}{16} \right) \right] - \left(\frac{3}{8} + \frac{3}{4} - \frac{1}{2} \right) + \frac{1}{16} + \frac{3}{4} - \left(-\frac{3}{16} - \frac{1}{2} \right) = \underline{\hspace{2cm}}$

**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.

$$\begin{aligned} & \frac{5}{8} - \left(\frac{7}{16} - \frac{22}{32} \right) - \frac{3}{4} \\ &= \frac{5}{8} \left(\frac{4}{4} \right) - \left(\frac{7}{16} \left(\frac{2}{2} \right) - \frac{22}{32} \right) - \frac{3}{4} \left(\frac{8}{8} \right) \\ &= \frac{20}{32} - \left(\frac{14}{32} - \frac{22}{32} \right) - \frac{21}{32} \\ &= \frac{20}{32} - \left(\frac{8}{32} \right) - \frac{21}{32} \\ &= \frac{20}{32} - \frac{8}{32} - \frac{21}{32} \\ &= -\frac{9}{32} \end{aligned}$$

= _____

Practice Section E

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

Calculate the answer to each of the questions below by following the ‘rules’ of fractions. Give your answer in lowest terms.

$$\left\{ \left(\frac{3}{4} - \frac{15}{16} - \frac{1}{8} \right) + \left[\frac{3}{4} - \left(\frac{3}{16} - \frac{1}{2} \right) + \frac{3}{4} - \left(\frac{1}{8} - \frac{1}{2} \right) \right] \right\} - \left[\frac{1}{2} - \left(\frac{1}{4} - \frac{7}{16} \right) - \left(\frac{5}{32} - \frac{7}{8} \right) \right] + \left[\frac{5}{32} - \left(\frac{1}{4} - \frac{1}{2} \right) \right]$$

= _____



SOLUTIONS

Set E

Multiplying & Dividing Fractions

**MULTIPLYING & DIVIDING FRACTIONS****Practice Section A**

1. Solution:

$$\begin{aligned}\frac{3}{4} \times \frac{1}{2} \\ &= \frac{3 \times 1}{4 \times 2} \\ &= \frac{3}{8}\end{aligned}$$

2. Solution:

$$\begin{aligned}\frac{3}{4} \div \frac{1}{2} \\ &= \frac{3}{4} \times \frac{2}{1} \\ &= \frac{3 \times 2}{4 \times 1} \\ &= \frac{6}{4} \\ &= \frac{3}{2}\end{aligned}$$

3. Solution:

$$\begin{aligned}\frac{3}{4} \times \frac{1}{8} \\ &= \frac{3 \times 1}{4 \times 8} \\ &= \frac{3}{32}\end{aligned}$$

4. Solution:

$$\begin{aligned}\frac{3}{4} \div \frac{1}{8} \\ &= \frac{3}{4} \times \frac{8}{1} \\ &= \frac{3 \times 8}{4 \times 1} \\ &= \frac{24}{4} \\ &= 6\end{aligned}$$

5. Solution:

$$\begin{aligned}\frac{1}{4} \times \frac{1}{2} \\ &= \frac{1 \times 1}{4 \times 2} \\ &= \frac{1}{8}\end{aligned}$$

6. Solution:

$$\begin{aligned}\frac{1}{4} \div \frac{1}{2} \\ &= \frac{1}{4} \times \frac{2}{1} \\ &= \frac{1 \times 2}{4 \times 1} \\ &= \frac{2}{4} \\ &= \frac{1}{2}\end{aligned}$$



7. Solution:

$$\begin{aligned}\frac{7}{8} \times \frac{1}{4} \\ &= \frac{7 \times 1}{8 \times 4} \\ &= \frac{7}{32}\end{aligned}$$

8. Solution:

$$\begin{aligned}\frac{7}{8} \div \frac{1}{4} \\ &= \frac{7}{8} \times \frac{4}{1} \\ &= \frac{28}{8} \\ &= \frac{14}{4} \\ &= \frac{7}{2}\end{aligned}$$

9. Solution:

$$\begin{aligned}\frac{3}{4} \times 2 \\ &= \frac{3}{4} \times \frac{2}{1} \\ &= \frac{3 \times 2}{4 \times 1} \\ &= \frac{6}{4} \\ &= \frac{3}{2}\end{aligned}$$

10. Solution:

$$\begin{aligned}\frac{3}{4} \div \frac{2}{1} \\ &= \frac{3}{4} \times \frac{1}{2} \\ &= \frac{3 \times 1}{4 \times 2} \\ &= \frac{3}{8}\end{aligned}$$

11. Solution:

$$\begin{aligned}\frac{1}{2} \times \frac{3}{16} \\ &= \frac{1 \times 3}{2 \times 16} \\ &= \frac{3}{32}\end{aligned}$$

12. Solution:

$$\begin{aligned}\frac{1}{2} \div \frac{3}{16} \\ &= \frac{1}{2} \times \frac{16}{3} \\ &= \frac{1 \times 16}{2 \times 3} \\ &= \frac{16}{6} \\ &= \frac{8}{3}\end{aligned}$$



13. Solution:

$$\begin{aligned}\frac{5}{16} \times 8 \\ &= \frac{5}{16} \times \frac{8}{1} \\ &= \frac{5 \times 8}{16 \times 1} \\ &= \frac{40}{16} \\ &= \frac{20}{8} \\ &= \frac{10}{4} \\ &= \frac{5}{2}\end{aligned}$$

14. Solution:

$$\begin{aligned}\frac{5}{16} \div 8 \\ &= \frac{5}{16} \times \frac{1}{8} \\ &= \frac{5 \times 1}{16 \times 8} \\ &= \frac{5}{128}\end{aligned}$$

15. Solution:

$$\begin{aligned}8 \div \frac{5}{16} \\ &= \frac{8}{1} \times \frac{16}{5} \\ &= \frac{8 \times 16}{1 \times 5} \\ &= \frac{128}{5}\end{aligned}$$

16. Solution:

$$\begin{aligned}\frac{5}{8} \times \frac{3}{4} \\ &= \frac{5 \times 3}{8 \times 4} \\ &= \frac{15}{32}\end{aligned}$$

17. Solution:

$$\begin{aligned}\frac{3}{8} \times \frac{3}{4} \\ &= \frac{3 \times 3}{8 \times 4} \\ &= \frac{9}{32}\end{aligned}$$

18. Solution:

$$\begin{aligned}\frac{3}{8} \div \frac{3}{4} \\ &= \frac{3}{8} \times \frac{4}{3} \\ &= \frac{3 \times 4}{8 \times 3} \\ &= \frac{12}{24} \\ &= \frac{1}{2}\end{aligned}$$



19. Solution:

$$\begin{aligned}\frac{3}{8} \times 3 \\ &= \frac{3}{8} \times \frac{3}{1} \\ &= \frac{3 \times 3}{8 \times 1} \\ &= \frac{9}{8}\end{aligned}$$

20. Solution:

$$\begin{aligned}\frac{3}{8} \div 3 \\ &= \frac{3}{8} \times \frac{1}{3} \\ &= \frac{3 \times 1}{8 \times 3} \\ &= \frac{3}{24} \\ &= \frac{1}{8}\end{aligned}$$

21. Solution:

$$\begin{aligned}3 \times \frac{9}{16} \\ &= \frac{3}{1} \times \frac{9}{16} \\ &= \frac{3 \times 9}{1 \times 16} \\ &= \frac{27}{16}\end{aligned}$$

22. Solution:

$$\begin{aligned}3 \div \frac{9}{16} \\ &= \frac{3}{1} \div \frac{9}{16} \\ &= \frac{3}{1} \times \frac{16}{9} \\ &= \frac{(1)\cancel{3}}{1} \times \frac{16}{(3)\cancel{9}} \\ &= \frac{16}{3}\end{aligned}$$

23. Solution:

$$\begin{aligned}\frac{1}{2} \div \frac{7}{8} \times 4 \\ &= \frac{1}{2} \times \frac{8}{7} \times \frac{4}{1} \\ &= \frac{1}{(1)\cancel{2}} \times \frac{8}{7} \times \frac{(2)\cancel{4}}{1} \\ &= \frac{8 \times 2}{7 \times 1} \\ &= \frac{16}{7}\end{aligned}$$

24. Solution:

$$\begin{aligned}\left(\frac{1}{2} \div \frac{7}{8}\right) \times 4 \\ &= \left(\frac{1}{2} \times \frac{8}{7}\right) \times \frac{4}{1} \\ &= \left(\frac{8}{14}\right) \times \frac{4}{1} \\ &= \frac{8}{(7)\cancel{14}} \times \frac{\cancel{4}(2)}{1} \\ &= \frac{8 \times 2}{7 \times 1} \\ &= \frac{16}{7}\end{aligned}$$



25. Solution:

$$\begin{aligned} & \frac{1}{2} \div \left(\frac{7}{8} \times 4 \right) \\ &= \frac{1}{2} \div \left(\frac{7}{\cancel{(2)}8} \times \frac{\cancel{(1)}4}{1} \right) \\ &= \frac{1}{2} \div \left(\frac{7 \times 1}{2 \times 1} \right) \\ &= \frac{1}{2} \div \frac{7}{2} \\ &= \frac{1}{2} \times \frac{2}{7} \\ &= \frac{\cancel{1}}{\cancel{(1)}2} \times \frac{\cancel{(1)}2}{7} \\ &= \frac{1}{7} \end{aligned}$$

Practice Section B

1. Solution:

$$\begin{aligned} & \frac{1}{2} \times \frac{3}{16} \div \frac{3}{4} \\ &= \frac{1}{2} \times \frac{3}{16} \times \frac{4}{3} \\ &= \frac{1}{2} \times \frac{\cancel{(1)}3}{\cancel{(4)}16} \times \frac{\cancel{4}}{\cancel{(1)}3} \\ &= \frac{1 \times 1 \times 1}{2 \times 4 \times 1} \\ &= \frac{1}{8} \end{aligned}$$

2. Solution:

$$\begin{aligned} & \frac{1}{2} \div \frac{7}{8} \div \frac{3}{4} \\ &= \frac{1}{2} \times \frac{8}{7} \times \frac{4}{3} \\ &= \frac{1}{\cancel{(1)}2} \times \frac{8}{7} \times \frac{\cancel{(2)}4}{3} \\ &= \frac{1 \times 8 \times 2}{1 \times 7 \times 3} \\ &= \frac{16}{21} \end{aligned}$$



3. Solution:

$$\begin{aligned}\frac{9}{16} \div \frac{1}{2} \times \frac{5}{8} \\&= \frac{9}{16} \times \frac{2}{1} \times \frac{5}{8} \\&= \frac{9}{16} \times \frac{(1)\cancel{2}}{1} \times \frac{5}{(4)\cancel{8}} \\&= \frac{9 \times 1 \times 5}{16 \times 1 \times 4} \\&= \frac{45}{64}\end{aligned}$$

4. Solution:

$$\begin{aligned}\frac{3}{4} \times \frac{5}{8} \div \frac{1}{4} \\&= \frac{3}{4} \times \frac{5}{8} \times \frac{4}{1} \\&= \frac{3}{(1)\cancel{4}} \times \frac{5}{8} \times \frac{(1)\cancel{4}}{1} \\&= \frac{3 \times 5 \times 1}{1 \times 8 \times 1} \\&= \frac{15}{8}\end{aligned}$$

5. Solution:

$$\begin{aligned}\frac{3}{4} \div \frac{7}{8} \times \frac{1}{4} \\&= \frac{3}{4} \times \frac{8}{7} \times \frac{1}{4} \\&= \frac{3}{(1)\cancel{4}} \times \frac{(2)\cancel{8}}{7} \times \frac{1}{4} \\&= \frac{3 \times 2 \times 1}{1 \times 7 \times 4} \\&= \frac{6}{28} \\&= \frac{3}{14}\end{aligned}$$

6. Solution:

$$\begin{aligned}\frac{13}{16} \div \frac{3}{4} \times \frac{1}{8} \\&= \frac{13}{16} \times \frac{4}{3} \times \frac{1}{8} \\&= \frac{13}{16} \times \frac{(1)\cancel{4}}{3} \times \frac{1}{(2)\cancel{8}} \\&= \frac{13 \times 1 \times 1}{16 \times 3 \times 2} \\&= \frac{13}{96}\end{aligned}$$

7. Solution:

$$\begin{aligned}\frac{15}{16} \div \frac{1}{4} \div \frac{1}{2} \\&= \frac{15}{16} \times \frac{4}{1} \times \frac{2}{1} \\&= \frac{15}{(4)\cancel{16}} \times \frac{(1)\cancel{4}}{1} \times \frac{2}{1} \\&= \frac{15}{(2)\cancel{4}} \times \frac{1}{1} \times \frac{(1)\cancel{2}}{1} \\&= \frac{15 \times 1 \times 1}{2 \times 1 \times 1} \\&= \frac{15}{2}\end{aligned}$$

8. Solution:

$$\begin{aligned}\frac{3}{8} \div \frac{3}{4} \times \frac{5}{16} \\&= \frac{3}{8} \times \frac{4}{3} \times \frac{5}{16} \\&= \frac{(1)\cancel{3}}{8} \times \frac{(1)\cancel{4}}{(1)\cancel{3}} \times \frac{5}{(4)\cancel{16}} \\&= \frac{1 \times 1 \times 5}{8 \times 1 \times 4} \\&= \frac{5}{32}\end{aligned}$$



9. Solution:

$$\begin{aligned}\frac{3}{8} \div \frac{1}{8} \div \frac{1}{2} \\&= \frac{3}{8} \times \frac{8}{1} \times \frac{2}{1} \\&= \frac{3}{\cancel{(1)}^{\cancel{1}}} \times \frac{\cancel{(1)}^{\cancel{1}}}{1} \times \frac{2}{1} \\&= \frac{3 \times 1 \times 2}{1 \times 1 \times 1} \\&= \frac{6}{1} \\&= 6\end{aligned}$$

10. Solution:

$$\begin{aligned}\frac{9}{32} \div \frac{9}{16} \times \frac{1}{4} \\&= \frac{9}{32} \times \frac{16}{9} \times \frac{1}{4} \\&= \frac{\cancel{(1)}^{\cancel{1}}}{32} \times \frac{\cancel{(4)}^{\cancel{16}}}{\cancel{(1)}^{\cancel{1}}} \times \frac{1}{\cancel{(1)}^{\cancel{4}}} \\&= \frac{1}{\cancel{(8)}^{\cancel{32}}} \times \frac{\cancel{(1)}^{\cancel{16}}}{1} \times \frac{1}{1} \\&= \frac{1 \times 1 \times 1}{8 \times 1 \times 1} \\&= \frac{1}{8}\end{aligned}$$

11. Solution:

$$\begin{aligned}\frac{11}{16} \div \frac{3}{8} \times \frac{1}{16} \\&= \frac{11}{16} \times \frac{8}{3} \times \frac{1}{16} \\&= \frac{11}{\cancel{(2)}^{\cancel{16}}} \times \frac{\cancel{(1)}^{\cancel{8}}}{3} \times \frac{1}{16} \\&= \frac{11 \times 1 \times 1}{2 \times 3 \times 16} \\&= \frac{11}{96}\end{aligned}$$

12. Solution:

$$\begin{aligned}\frac{3}{16} \times 4 \div \frac{1}{2} \\&= \frac{3}{16} \times \frac{4}{1} \times \frac{2}{1} \\&= \frac{3}{\cancel{(4)}^{\cancel{16}}} \times \frac{\cancel{(1)}^{\cancel{4}}}{1} \times \frac{2}{1} \\&= \frac{3}{\cancel{(2)}^{\cancel{4}}} \times \frac{1}{1} \times \frac{\cancel{(1)}^{\cancel{2}}}{1} \\&= \frac{3 \times 1 \times 1}{2 \times 1 \times 1} \\&= \frac{3}{2}\end{aligned}$$

13. Solution:

$$\begin{aligned}\frac{3}{16} \div \left(\frac{1}{4} \times \frac{1}{2} \right) \\&= \frac{3}{16} \div \left(\frac{1}{8} \right) \\&= \frac{3}{16} \times \frac{8}{1} \\&= \frac{3}{\cancel{(2)}^{\cancel{16}}} \times \frac{\cancel{(1)}^{\cancel{8}}}{1} \\&= \frac{3 \times 1}{2 \times 1} \\&= \frac{3}{2}\end{aligned}$$



14. Solution:

$$\begin{aligned} & \frac{3}{8} \div \left(\frac{3}{4} \times \frac{5}{16} \right) \\ &= \frac{3}{8} \div \left(\frac{15}{64} \right) \\ &= \frac{3}{8} \times \frac{64}{15} \\ &= \frac{(1)\cancel{3}}{(1)\cancel{3}} \times \frac{(8)\cancel{64}}{(5)\cancel{15}} \\ &= \frac{1 \times 8}{1 \times 5} \\ &= \frac{8}{5} \end{aligned}$$

15. Solution:

$$\begin{aligned} & 8 \div \left(\frac{9}{16} \times \frac{1}{4} \right) \\ &= 8 \div \left(\frac{9}{64} \right) \\ &= \frac{8}{1} \times \frac{64}{9} \\ &= \frac{512}{9} \end{aligned}$$

16. Solution:

$$\begin{aligned} & \frac{5}{16} \div \left(\frac{3}{8} \times \frac{1}{4} \right) \\ &= \frac{5}{16} \div \left(\frac{3}{32} \right) \\ &= \frac{5}{16} \times \frac{32}{3} \\ &= \frac{5}{(1)\cancel{16}} \times \frac{(2)\cancel{32}}{3} \\ &= \frac{5 \times 2}{1 \times 3} \\ &= \frac{10}{3} \end{aligned}$$

17. Solution:

$$\begin{aligned} & \frac{3}{8} \div \frac{3}{4} \div \frac{5}{32} \div \frac{1}{2} \\ &= \frac{3}{8} \times \frac{4}{3} \times \frac{32}{5} \times \frac{2}{1} \\ &= \frac{(1)\cancel{3}}{(2)\cancel{3}} \times \frac{(1)\cancel{4}}{(1)\cancel{3}} \times \frac{32}{5} \times \frac{2}{1} \\ &= \frac{1}{(1)\cancel{2}} \times \frac{1}{1} \times \frac{32}{5} \times \frac{(1)\cancel{2}}{1} \\ &= \frac{1 \times 1 \times 32 \times 1}{1 \times 1 \times 5 \times 1} \\ &= \frac{32}{5} \end{aligned}$$



18. Solution:

$$\begin{aligned} & \frac{9}{16} \times \frac{1}{2} \div \frac{3}{32} \times \frac{1}{8} \\ &= \frac{9}{16} \times \frac{1}{2} \times \frac{32}{3} \times \frac{1}{8} \\ &= \frac{(3)\cancel{3}}{(1)\cancel{16}} \times \frac{1}{2} \times \frac{(2)\cancel{32}}{(1)\cancel{3}} \times \frac{1}{8} \\ &= \frac{3}{1} \times \frac{1}{(1)\cancel{2}} \times \frac{(1)\cancel{2}}{1} \times \frac{1}{8} \\ &= \frac{3 \times 1 \times 1 \times 1}{1 \times 1 \times 1 \times 8} \\ &= \frac{3}{8} \end{aligned}$$

19. Solution:

$$\begin{aligned} & \frac{9}{16} \times \left(\frac{1}{2} \div \frac{3}{32} \right) \times \frac{1}{8} \\ &= \frac{9}{16} \times \left(\frac{1}{2} \times \frac{32}{3} \right) \times \frac{1}{8} \\ &= \frac{9}{16} \times \left(\frac{32}{6} \right) \times \frac{1}{8} \\ &= \frac{(3)\cancel{3}}{(1)\cancel{16}} \times \frac{(2)\cancel{32}}{(2)\cancel{6}} \times \frac{1}{8} \\ &= \frac{3}{1} \times \frac{(1)\cancel{2}}{(1)\cancel{2}} \times \frac{1}{8} \\ &= \frac{3 \times 1 \times 1}{1 \times 1 \times 8} \\ &= \frac{3}{8} \end{aligned}$$

20. Solution:

$$\begin{aligned} & \frac{3}{4} \div \left(\frac{3}{4} \times \frac{5}{8} \right) \div 4 \\ &= \frac{3}{4} \div \frac{15}{32} \div 4 \\ &= \frac{3}{4} \times \frac{32}{15} \times \frac{1}{4} \\ &= \frac{(1)\cancel{3}}{(1)\cancel{4}} \times \frac{(8)\cancel{32}}{(5)\cancel{15}} \times \frac{1}{4} \\ &= \frac{1}{1} \times \frac{(2)\cancel{8}}{5} \times \frac{1}{(1)\cancel{4}} \\ &= \frac{1 \times 2 \times 1}{1 \times 5 \times 1} \\ &= \frac{2}{5} \end{aligned}$$

**Practice Section C****1.** Solution:

$$\begin{aligned} & \frac{3}{8} \div \frac{3}{4} \times \frac{5}{16} \div \frac{5}{32} \div \frac{1}{2} \\ &= \frac{3}{8} \times \frac{4}{3} \times \frac{5}{16} \times \frac{32}{5} \times \frac{2}{1} \\ &= \frac{(1)\cancel{3}}{(2)\cancel{8}} \times \frac{(1)\cancel{4}}{(1)\cancel{3}} \times \frac{(1)\cancel{5}}{(1)\cancel{16}} \times \frac{(2)\cancel{32}}{(1)\cancel{5}} \times \frac{2}{1} \\ &= \frac{1}{(1)\cancel{2}} \times \frac{1}{1} \times \frac{1}{1} \times \frac{(1)\cancel{2}}{1} \times \frac{2}{1} \\ &= \frac{1 \times 1 \times 1 \times 1 \times 2}{1 \times 1 \times 1 \times 1 \times 1} \\ &= \frac{2}{1} \\ &= 2 \end{aligned}$$

2. Solution:

$$\begin{aligned} & \frac{3}{4} \div \left(\frac{1}{2} \times 3 \right) \div \left(\frac{3}{8} \div \frac{1}{2} \right) \\ &= \frac{3}{4} \div \left(\frac{1}{2} \times \frac{3}{1} \right) \div \left(\frac{3}{8} \times \frac{2}{1} \right) \\ &= \frac{3}{4} \div \left(\frac{3}{2} \right) \div \left(\frac{6}{8} \right) \\ &= \frac{3}{4} \times \frac{2}{3} \times \frac{8}{6} \\ &= \frac{(1)\cancel{3}}{(1)\cancel{4}} \times \frac{(1)\cancel{2}}{(1)\cancel{3}} \times \frac{(2)\cancel{8}}{(3)\cancel{6}} \\ &= \frac{1 \times 1 \times 2}{1 \times 1 \times 3} \\ &= \frac{2}{3} \end{aligned}$$

3. Solution:

$$\begin{aligned} & \left(\frac{7}{16} \div \frac{3}{4} \right) \times \left(\frac{3}{4} \div \frac{5}{8} \right) \div \frac{1}{2} \\ &= \left(\frac{7}{16} \times \frac{4}{3} \right) \times \left(\frac{3}{4} \times \frac{8}{5} \right) \times \frac{2}{1} \\ &= \frac{28}{48} \times \frac{24}{20} \times \frac{2}{1} \\ &= \frac{(7)\cancel{28}}{(12)\cancel{48}} \times \frac{(6)\cancel{24}}{(5)\cancel{20}} \times \frac{2}{1} \\ &= \frac{7}{12} \times \frac{6}{5} \times \frac{2}{1} \\ &= \frac{7}{(2)\cancel{12}} \times \frac{(1)\cancel{6}}{5} \times \frac{2}{1} \\ &= \frac{7}{(1)\cancel{2}} \times \frac{1}{5} \times \frac{(1)\cancel{2}}{1} \\ &= \frac{7 \times 1 \times 1}{1 \times 5 \times 1} \\ &= \frac{7}{5} \end{aligned}$$



4. Solution:

$$\begin{aligned}
& \left(\frac{3}{8} \div \frac{3}{4}\right) \times \left(\frac{5}{16} \div \frac{5}{32}\right) \div \left(6 \times \frac{3}{16}\right) \\
&= \left(\frac{3}{8} \times \frac{4}{3}\right) \times \left(\frac{5}{16} \times \frac{32}{5}\right) \div \left(\frac{6}{1} \times \frac{3}{16}\right) \\
&= \left(\frac{\cancel{3}}{(2)\cancel{3}} \times \frac{(1)\cancel{4}}{(1)\cancel{3}}\right) \times \left(\frac{(1)\cancel{5}}{(1)\cancel{16}} \times \frac{(2)\cancel{32}}{(1)\cancel{5}}\right) \div \left(\frac{6}{1} \times \frac{3}{16}\right) \\
&= \left(\frac{1}{2}\right) \times \left(\frac{2}{1}\right) \div \left(\frac{(3)\cancel{6}}{1} \times \frac{3}{(8)\cancel{16}}\right) \\
&= \frac{1}{2} \times \frac{2}{1} \div \frac{9}{8} \\
&= \frac{1}{2} \times \frac{2}{1} \times \frac{8}{9} \\
&= \frac{1}{\cancel{2}} \times \frac{(1)\cancel{2}}{1} \times \frac{8}{9} \\
&= \frac{1 \times 1 \times 8}{1 \times 1 \times 9} \\
&= \frac{8}{9}
\end{aligned}$$

5. Solution:

$$\begin{aligned}
& 4 \times \frac{3}{16} \div \left[\left(\frac{3}{4} \times \frac{5}{32}\right) \times \frac{5}{32}\right] \times \left(\frac{25}{64} \times \frac{5}{16}\right) \\
&= \frac{(1)\cancel{4}}{1} \times \frac{3}{(4)\cancel{16}} \div \left[\left(\frac{15}{128}\right) \times \frac{5}{32}\right] \times \left(\frac{125}{1024}\right) \\
&= \frac{3}{4} \div \left[\frac{75}{4096}\right] \times \left(\frac{125}{1024}\right) \\
&= \frac{3}{4} \times \frac{4096}{75} \times \frac{125}{1024} \\
&= \frac{3}{4} \times \frac{(4)\cancel{4096}}{(3)\cancel{75}} \times \frac{(5)\cancel{125}}{(1)\cancel{1024}} \\
&= \frac{3}{4} \times \frac{4}{3} \times \frac{5}{1} \\
&= \frac{(1)\cancel{3}}{(1)\cancel{4}} \times \frac{(1)\cancel{4}}{(1)\cancel{3}} \times \frac{5}{1} \\
&= \frac{1 \times 1 \times 5}{1 \times 1 \times 1} \\
&= \frac{5}{1} \\
&= 5
\end{aligned}$$

**Practice Section D**

1. Solution:

Although the brackets in B mean that the division is done before the multiplication, all three expressions are equal to $\frac{1}{8}$. This means that Jim is correct. (Note that the brackets in C make it no different than A.)

$$\begin{array}{lll}
 \text{A. } \frac{1}{2} \times \frac{3}{16} \div \frac{3}{4} & \text{B. } \frac{1}{2} \times \left(\frac{3}{16} \div \frac{3}{4} \right) & \text{C. } \left(\frac{1}{2} \times \frac{3}{16} \right) \div \frac{3}{4} \\
 = \frac{1}{2} \times \frac{3}{16} \times \frac{4}{3} & = \frac{1}{2} \times \left(\frac{3}{16} \times \frac{4}{3} \right) & = \left(\frac{3}{32} \right) \times \frac{4}{3} \\
 = \frac{1}{2} \times \frac{(1)\cancel{3}}{(4)\cancel{16}} \times \frac{(1)\cancel{4}}{(1)\cancel{3}} & = \frac{1}{2} \times \left(\frac{(1)\cancel{3}}{(4)\cancel{16}} \times \frac{(1)\cancel{4}}{(1)\cancel{3}} \right) & = \frac{(1)\cancel{3}}{(8)\cancel{32}} \times \frac{(1)\cancel{4}}{(1)\cancel{3}} \\
 = \frac{1 \times 1 \times 1}{2 \times 4 \times 1} & = \frac{1 \times 1 \times 1}{2 \times 4 \times 1} & = \frac{1 \times 1}{8 \times 1} \\
 = \frac{1}{8} & = \frac{1}{8} & = \frac{1}{8}
 \end{array}$$

Practice Section E

Solution:

Hannah

$$\begin{aligned}
 & 40 \times 7 \frac{1}{4} \\
 & = (40 \times 7) + \left(40 \times \frac{1}{4} \right) \\
 & = 280 + 10 \\
 & = \$290
 \end{aligned}$$

Jack

$$\begin{aligned}
 & 40 \times 6 \frac{1}{2} \\
 & = (40 \times 6) + \left(40 \times \frac{1}{2} \right) \\
 & = 240 + 20 \\
 & = \$260
 \end{aligned}$$

If Jack makes \$260 a week, he earns $\$290 - \$260 = \$30$ less than Hannah. If Jack works an extra 4 hours, he will make \$26 which will total \$286. If he works $4\frac{1}{2}$ hours, he will still not have enough since an extra $4\frac{1}{2}$ hours is \$29.25 yielding \$289.25. Jack will have to work 5 extra hours a week to earn.