February 18, 2016

Math 8

Order of Operations with Fractions

B - Brackets
E - Exponents
DM - Multiplication and Division in the order they occur
AS - Addition and Subtraction in the order they occur common denominators

Examples:

(a) $\frac{20}{21} \div \frac{3}{7} \times \frac{1}{5} + (\frac{1}{2} + \frac{1}{4})$

$= \frac{20}{21} \div \frac{3}{7} \times \frac{1}{5} + (\frac{2}{4} + \frac{1}{4})$

$= \frac{20}{21} \div \frac{3}{7} \times \frac{1}{5} + \frac{3}{4}$ Flip and x

$= \frac{20}{21} \times \frac{7}{3} \times \frac{1}{5} + \frac{3}{4}$ Reduce

$= \frac{4}{9} \times \frac{1}{1} + \frac{3}{4}$ Reduce

$= \frac{4 \times 4}{9 \times 4} + \frac{3 \times 9}{4 \times 9}$

$= \frac{16}{36} + \frac{27}{36}$

$= \frac{43}{36}$

$= 1\frac{7}{36}$

Put final answer as a mixed number

b) $2 \times \frac{3}{5} + \frac{1}{3} \div \frac{4}{15}$

$= \frac{6}{5} + \frac{1}{3} \div \frac{4}{15}$ Flip and x

$= \frac{6}{5} + \frac{1}{3} \times \frac{15}{4}$ Reduce

$= \frac{6 \times 4}{5 \times 4} + \frac{5 \times 5}{4 \times 5}$

$= \frac{24}{20} + \frac{25}{20}$

$= \frac{49}{20}$

$= 2\frac{9}{20}$

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4 a) $\frac{1}{3} \times \left(\frac{7}{8} - \frac{3}{4}\right)$

$\frac{1}{3} \times \left(\frac{7}{8} - \frac{6}{8}\right)$

$\frac{1}{3} \times \frac{1}{8} = \frac{1}{24}$

b) $\frac{7}{8} \div \left(\frac{1}{3} \times \frac{1}{8}\right)$

$\frac{7}{8} \div \frac{1}{24}$

$\frac{7}{1} \times \frac{24^{3}}{1} = 21$

c) $\frac{9}{5} \times \left(\frac{3}{5} \div \frac{1}{10}\right)$

$\frac{9}{5} \times \left(\frac{3}{5} \times \frac{10}{1}\right)$

$\frac{9}{5} \times \frac{30}{5} = \frac{270}{25} \div 5$

or Reduce $= \frac{54}{5}$

$\frac{9}{5} \times \frac{6}{1}$

d) $\left(\frac{5}{3} + \frac{7}{12}\right) \times \frac{4}{9}$

$\left(\frac{20}{12} + \frac{7}{12}\right) \times \frac{4}{9}$

$\frac{27^{3}}{12_{4}} \times \frac{4^{1}}{9_{3}} = \frac{3}{3}$

$= 1$

(or $\frac{108}{108} = 1$)

5. $\frac{5}{9} + \frac{2}{3} \times \frac{1}{2}$

$\frac{5}{9} + \frac{2}{6}$

$\frac{10}{18} + \frac{6}{18} = \frac{16}{18}$ Reduce

$= \frac{8}{9}$

Raj was correct.

6. a) $\frac{1}{2} \times \frac{3}{5} + \frac{1}{4}$

$\frac{3}{10} + \frac{1}{4}$

$\frac{6}{20} + \frac{5}{20} = \frac{11}{20}$

b) $\frac{2}{3} + \frac{5}{6} \div \frac{1}{2}$

$\frac{2}{3} + \frac{5}{6} \times \frac{2}{1}$

$\frac{2}{3} + \frac{10}{6}$

$\frac{4}{6} + \frac{10}{6} = \frac{14}{6}$ or $\frac{7}{3}$

c) $\frac{4}{5} \div \frac{7}{10} + \frac{1}{3}$

$\frac{4}{5} \times \frac{10}{7} + \frac{1}{3}$

$\frac{40}{35} + \frac{1}{3}$

$\frac{8}{7} + \frac{1}{3}$

$\frac{24}{21} + \frac{7}{21} = \frac{31}{21}$

d) $\frac{1}{4} \times \left(\frac{11}{12} - \frac{5}{6}\right)$

$\frac{1}{4} \times \left(\frac{11}{12} - \frac{10}{12}\right)$

$\frac{1}{4} \times \frac{1}{12} = \frac{1}{48}$

e) $\frac{1}{2} \times \left(\frac{4}{5} \div \frac{3}{10}\right)$

$\frac{1}{2} \times \left(\frac{4}{\cancel{5}_{1}} \times \frac{\cancel{10}^{2}}{3}\right)$

$\frac{1}{2} \times \frac{40}{15} = \frac{40}{30}$

$= \frac{4}{3}$

$\frac{1}{2} \times \frac{8}{3} = \frac{8 \div 2}{6 \div 2}$

f) $\left(\frac{3}{5} + \frac{7}{15}\right) \times \frac{5}{6}$

$\left(\frac{9}{15} + \frac{7}{15}\right) \times \frac{5}{6}$

$\frac{\cancel{16}^{8}}{\cancel{15}_{3}} \times \frac{\cancel{5}^{1}}{\cancel{6}_{3}} = \frac{80}{90}$

$= \frac{8}{9}$

A jug holds $2\frac{2}{5}$ liters of water. A bucket holds 15 liters of water. How many small jugs can be filled from the water in the bucket?

$15 \div \underbrace{2\frac{2}{5}}_{\text{Improper}}$

$15 \div \frac{12}{5}$

Flip and X

$= \frac{15}{1} \times \frac{5}{12} = \frac{75 \div 3}{12 \div 3} = \frac{25}{4} = 6\frac{1}{4}$

$= \frac{5 \times 5}{1 \times 4}$

$= \frac{25}{4}$

$= 6\frac{1}{4}$

$6\frac{1}{4}$ Jugs can be filled with 15 L of H_2O

BEDMAS

Evaluate

$$\frac{1}{2} - \frac{3}{5} \times \frac{1}{6}$$

Multiply

$$= \frac{1}{2} - \frac{3}{30} \quad \div 3, \div 3 \text{ Reduce}$$

$$= \frac{1 \times 5}{2 \times 5} - \frac{1}{10}$$

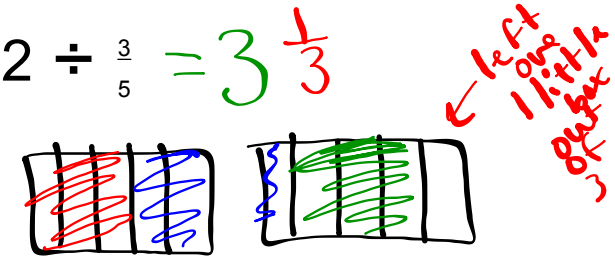
$$= \frac{5}{10} - \frac{1}{10}$$

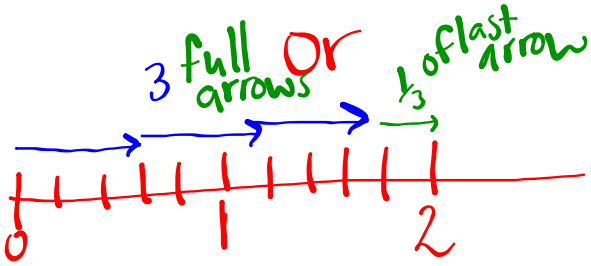
$$= \frac{4}{10} \quad \div 2, \div 2 \text{ Reduce}$$

$$= \frac{2}{5}$$

Use a diagram to find

$$2 \div \frac{3}{5} = 3\frac{1}{3}$$





Find Two Different Fractions that have a product of $2\frac{11}{12}$

$\frac{}{} \times \frac{}{} = 2\frac{11}{12}$

make improper

$2\frac{1}{3} \times 1\frac{1}{4}$ $\frac{7}{6(3)} \times \frac{5}{2(4)} = \frac{35}{12}$

$\frac{7}{3} \times \frac{5}{4}$

$\frac{7}{6} \times \frac{5}{2}$

$1\frac{1}{6} \times 2\frac{1}{2}$

Class/Homework

Test FRIDAY, Feb. 19
TEST Tomorrow

pg. 155 # 7(a,c), 10, 11

pg. 159 # 3, 4(a), 5, 7, 9,11,12, 13(b),14(b,c), 15,16, 19(a,d), 23(a,b), 25, 27, 29, 30

All Solutions are attached

Test Outline

7 Multiple Choice 7 points

8 Short Response 45 points

} 52

Review for Test

Be able to find equivalent fractions and reduce fractions
Be able to change from mixed number to an improper fraction and vice versa

Be able to add and subtract proper, improper fractions and mixed numbers

Be able to model multiplication of fractions using number lines and squares.
Be able to model division of fractions using number lines and squares.

Be able to multiply and divide fractions and mixed numbers using "rules"

Be able to solve word problems involving addition, subtraction, multiplication and division of fractions.

Be able to solve order of operations questions involving fractions.

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7a) $\frac{1}{8} \times \frac{3}{4} \times \frac{7}{5} \div \frac{7}{10}$

$\frac{3}{32} \times \frac{7}{5} \div \frac{7}{10}$

$\frac{21}{160} \times \frac{10}{7} = \frac{21}{112}$

$= \frac{3}{16}$

$\frac{210}{1120}$

Feb17 Homework solutions

Pg 155 #7 to # 11

b) $\frac{14}{15} \div \frac{2}{3} \times \frac{5}{8} + \frac{3}{4}$

$\frac{14}{15} \times \frac{3}{2} \times \frac{5}{8} + \frac{3}{4}$

$\frac{42}{30} \times \frac{5}{8} + \frac{3}{4}$

$\frac{210}{240} + \frac{3}{4}$

$\frac{21}{24} + \frac{18}{24} = \frac{39}{24}$

$= \frac{13}{8}$

c) $\frac{2}{3} - \frac{1}{4} + \frac{1}{2} \div \frac{2}{5}$

$\frac{2}{3} - \frac{1}{4} + \frac{1}{2} \times \frac{5}{2}$

$\frac{2}{3} - \frac{1}{4} + \frac{5}{4}$

$\frac{8}{12} - \frac{3}{12} + \frac{15}{12}$

$\frac{20}{12}$ or $\frac{5}{3}$

Feb17 Homework solutions

Pg 155 #7 to # 11

d) $\frac{5}{6} - \frac{1}{5} \times \frac{5}{8} + \frac{2}{3}$

$\frac{5}{6} - \frac{5}{40} + \frac{2}{3}$

$\frac{100}{120} - \frac{15}{120} + \frac{80}{120} = \frac{165}{120}$

$= \frac{33}{24} = \frac{11}{8}$

$\frac{5}{6} - \frac{1}{8} + \frac{2}{3}$

$\frac{20}{24} - \frac{3}{24} + \frac{16}{24}$

$\frac{17}{24} + \frac{16}{24}$

$\frac{33}{24}$

$= 1\frac{1}{8}$

Feb17 Homework solutions
Pg 155 #7 to # 11

8 a)
No they are not the same

- in $1\frac{1}{2} \div \frac{1}{4} \times \frac{2}{3}$, you do the division first
- in $1\frac{1}{2} \div (\frac{1}{4} \times \frac{2}{3})$, you do the multiplication in the brackets first.

9a) $\frac{7}{10} - (\frac{1}{5} + \frac{1}{4}) \times \frac{2}{3}$

$\frac{7}{10} - (\frac{4}{20} + \frac{5}{20}) \times \frac{2}{3}$

$\frac{7}{10} - \frac{9}{20} \times \frac{2}{3}$

$\frac{7}{10} - \frac{18}{60}$

$\frac{42}{60} - \frac{18}{60}$

$\frac{24}{60}$ or $\frac{2}{5}$

$\frac{7}{10} - \frac{18}{60}$

$\frac{7}{10} - \frac{3}{10}$

$\frac{4}{10}$ or $\frac{2}{5}$

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Feb17 Homework solutions

Pg 155 #7 to # 11

9 b) $\left(\frac{1}{4}+\frac{5}{6}-\frac{1}{3}\right)\times\frac{8}{5}$

$\left(\frac{3}{12}+\frac{10}{12}-\frac{4}{12}\right)\times\frac{8}{5}$

$\frac{9}{12}\times\frac{8}{5}=\frac{72}{60}$ ÷12 ÷12

$=\frac{6}{5}$

c) $\left(\frac{6}{5}+\frac{4}{10}\right)\times\left(\frac{3}{8}-\frac{1}{16}\right)$

$\left(\frac{12}{10}+\frac{4}{10}\right)\times\left(\frac{12}{32}-\frac{2}{32}\right)$

$\frac{16}{10}\times\frac{10}{32}=\frac{16}{32}$ or $\frac{1}{2}$

$\frac{16}{10}\times\frac{10}{32}=\frac{160}{320}$

$=\frac{1}{2}$

10a) $\frac{5}{2}+\frac{1}{4}\times\frac{4}{5}\div\frac{1}{10}-\frac{1}{2}$

$\frac{5}{2}+\frac{4}{20}\times\frac{10}{1}-\frac{1}{2}$

$\frac{5}{2}+\frac{40}{20}-\frac{1}{2}$

$\frac{5}{2}+\frac{4}{2}-\frac{1}{2}$

$\frac{8}{2}$ or 4

$\frac{5}{2}+\frac{40}{20}-\frac{1}{2}$

$2\frac{1}{2}+2-\frac{1}{2}$

4

Feb17 Homework solutions

Pg 155 #7 to # 11

b) $\frac{4}{9} \times \left(\frac{2}{3} - \frac{1}{6}\right) - \frac{1}{8} \times \frac{4}{3}$

$\frac{4}{9} \times \left(\frac{4}{6} - \frac{1}{6}\right) - \frac{1}{8} \times \frac{4}{3}$

$\frac{4}{9} \times \frac{3}{6} - \frac{1}{8} \times \frac{4}{3}$

$\frac{12}{36} - \frac{4}{24}$

$\frac{2}{6} - \frac{1}{6} = \frac{1}{6}$

11. $4 \times \left(\frac{3}{4} - \frac{1}{2}\right) + \frac{13}{6} \times \frac{1}{2}$

$4 \times \left(\frac{3}{4} - \frac{2}{4}\right) + \frac{13}{6} \times \frac{1}{2}$

$\frac{4}{1} \times \frac{1}{4} + \frac{13}{6} \times \frac{1}{2}$

$1 + \frac{13}{12}$

$1 + 1\frac{1}{12} = 2\frac{1}{12}$

Myra was correct

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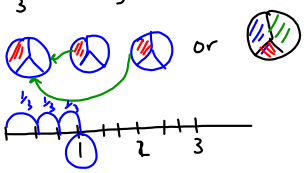
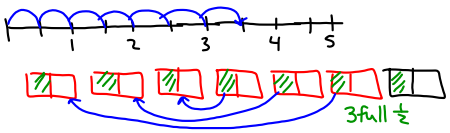
1) a) $\frac{2}{5} \times 6 = 2\frac{2}{5}$ b) $\frac{6}{7} \times 3 = 2\frac{4}{7}$

Feb17 Homework solutions
Pg 159 #1 to # 4

2a) $\frac{1}{3} \times 3 = \frac{3}{3} = 1$



2b) $7 \times \frac{1}{2} = 3\frac{1}{2}$



c) $8 \times \frac{2}{5} = 3\frac{1}{5}$

$\frac{16}{5}$

3a) $\frac{3}{5} \times \frac{30}{1} = \frac{90}{5} = 18$ 18 students are girls

$\frac{3}{\cancel{5}_{1}} \times \frac{\cancel{30}^{6}}{1}$

$\frac{18}{1}$

$= 18$

3b) $6 \times \frac{2}{3} = \frac{12}{3} = 4$ full glasses

3c) $\frac{2}{3} \times 75$ 50 new cars

$\frac{2}{\cancel{3}_{1}} \times \frac{\cancel{75}^{25}}{1}$

$\frac{2 \times 25}{1 \times 1}$

$= 50$

3d) $\frac{1}{12} \times \frac{18}{1}$

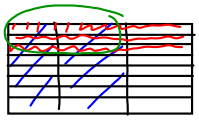
$= \frac{18}{12}$

$= \frac{\cancel{18}^{3}}{\cancel{12}_{2}}$

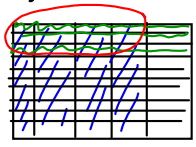
$= \frac{3}{2}$

$= 1\frac{1}{2}$ cakes needed

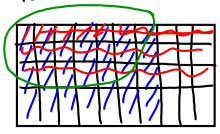
4a) $\frac{2}{3} \times \frac{3}{8} = \frac{6}{24} = \frac{1}{4}$



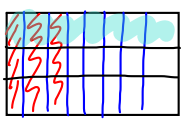
b) $\frac{4}{5} \times \frac{3}{10} = \frac{12}{50}$



4c) $\frac{7}{10} \times \frac{3}{7} = \frac{21}{40}$



4d) $\frac{3}{7} \times \frac{1}{3} = \frac{3}{21} = \frac{1}{7}$



5) $\frac{3}{5} \times \frac{1}{4}$

$\frac{3}{20}$

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6. a) $\frac{1}{2} \times \frac{3}{10} = \frac{3}{20}$

closer to 0 (small fraction)

b) $\frac{3}{5} \times \frac{1}{8} = \frac{3}{40}$

small fraction, close to 0

c) $\frac{7}{8} \times \frac{2}{5} = \frac{14}{40}$

less than $\frac{1}{2}$

d) $\frac{\cancel{3}^{1}}{\cancel{11}_{1}} \times \frac{\cancel{44}^{4}}{\cancel{63}_{21}} = \frac{4}{21}$

7. $\frac{2}{5}$ of $\frac{3}{4}$

$\frac{2}{5} \times \frac{3}{4} = \frac{6}{20}$

or $\frac{3}{10}$

11. a) $1\frac{2}{3} \times 1\frac{9}{10} \approx 2 \times 2 = 4$

$\frac{5}{3} \times \frac{19}{10} = \frac{95}{30}$

$= \frac{19}{6}$

b) $4\frac{1}{2} \times \frac{5}{8}$ $\approx \frac{1}{2}$ of 4

$\frac{9}{2} \times \frac{5}{8} = \frac{45}{16}$ 2

c) $\frac{9}{5} \times \frac{14}{8} \approx 2 \times 2 = 4$

< 4

$= \frac{116}{40}$

$= \frac{58}{20} = \frac{29}{10}$

d) $1\frac{3}{10} \times 6\frac{2}{3}$ $\approx 1 \times 7 = 7$

$\frac{13}{\cancel{10}} \times \frac{\cancel{20}}{3}$

$= \frac{26}{3}$

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

$\frac{7}{4} \times \frac{7}{3} = \frac{49}{12}$ or $4\frac{1}{12}$ hours to mow the lawn

14. a) $\frac{3}{1} \div \frac{4}{5}$

$\frac{3}{1} \times \frac{5}{4} = \frac{15}{4}$

b) $4 \div \frac{5}{6}$

$\frac{4}{1} \times \frac{6}{5} = \frac{24}{5}$

c) $\frac{3}{10} \div 2$

$\frac{3}{10} \times \frac{1}{2} = \frac{3}{20}$

d) $2\frac{5}{8} \div 3$

$\frac{21}{8} \times \frac{1}{3} = \frac{21}{24}$

$= \frac{7}{8}$

19. a) $\frac{3}{4} \div \frac{3}{8}$

$\frac{3}{4} \times \frac{8}{3} = \frac{24}{12}$

$= 2$

b) $\frac{1}{4} \div \frac{7}{8}$

$\frac{1}{4} \times \frac{8}{7} = \frac{8}{28}$

$= \frac{2}{7}$

c) $\frac{5}{12} \div \frac{1}{3}$

$\frac{5}{12} \times \frac{3}{1} = \frac{15}{12}$

$= \frac{5}{4}$

d) $\frac{1}{2} \div \frac{3}{5}$

$\frac{1}{2} \times \frac{5}{3} = \frac{5}{6}$

20. $\frac{7}{8} \div \frac{1}{6}$

$\frac{7}{8} \times \frac{6}{1} = \frac{42}{8}$

$= \frac{21}{4}$

23.

a) $1\frac{3}{4} \div 2\frac{1}{8}$

$\frac{7}{4} \div \frac{17}{8}$

$\frac{7}{4} \times \frac{8}{17} = \frac{14}{17}$

b) $3\frac{5}{6} \div 2\frac{1}{5}$

$\frac{23}{6} \div \frac{11}{5}$

$\frac{23}{6} \times \frac{5}{11} = \frac{115}{66}$

c) $3\frac{1}{2} \div 1\frac{3}{8}$

$\frac{7}{2} \div \frac{11}{8}$

$\frac{7}{2} \times \frac{8}{11} = \frac{28}{11}$

d) $2\frac{1}{5} \div 4\frac{2}{5}$

$\frac{11}{5} \div \frac{22}{5}$

$\frac{11}{5} \times \frac{5}{22} = \frac{11}{22} = \frac{1}{2}$

25. $\frac{3}{4} - \frac{5}{8}$

$\frac{6}{8} - \frac{5}{8} = \frac{1}{8}$ She needs $\frac{1}{8}$ of a cup

27. $\frac{1}{3} + \frac{1}{6} + \frac{1}{5}$

$\frac{10}{30} + \frac{5}{30} + \frac{6}{30} = \frac{21}{30}$ or $\frac{7}{10}$

Walk $1 - \frac{7}{10} = \frac{3}{10}$ walk to school

b) $\frac{3}{10}$ of 30

$\frac{1}{10}$ of $30 = 3$

$\frac{3}{10}$ of $30 = 3 \times 3$

$= 9$ 9 students walk.

28 a) $\frac{1}{5} + \frac{2}{3} \times \frac{3}{5}$

$\frac{1}{5} + \frac{2}{5}$

$\frac{3}{5}$

b) $\frac{4}{5} \div \left(\frac{2}{3} - \frac{3}{10}\right)$

$\frac{4}{5} \div \left(\frac{20}{30} - \frac{9}{30}\right)$

$\frac{4}{5} \div \frac{11}{30}$

$\frac{4}{5} \times \frac{30}{11} = \frac{120}{55}$

$= \frac{24}{11}$

c) $\frac{7}{3} + \frac{1}{6} \times \frac{2}{5}$

$\frac{7}{3} + \frac{2}{30}$

$\frac{70}{30} + \frac{2}{30} = \frac{72}{30}$

$= \frac{12}{5}$

d) $\frac{7}{8} \div \frac{5}{6} \times \frac{4}{7}$

$\frac{7}{8} \times \frac{6}{5} \times \frac{4}{7}$

$\frac{42}{40} \times \frac{4}{7}$

$\frac{168}{280} = \frac{42}{70}$

$= \frac{6}{10}$

$= \frac{3}{5}$

29. a) $\frac{2}{3} + \frac{1}{4} - \frac{1}{6}$

$\frac{8}{12} + \frac{3}{12} - \frac{2}{12} = \frac{9}{12}$

$= \frac{3}{4}$

b) $\frac{3}{2} \times \left(\frac{4}{3} - \frac{1}{6}\right)$

$\frac{3}{2} \times \left(\frac{8}{6} - \frac{1}{6}\right)$

$\frac{3}{2} \times \frac{7}{6} = \frac{21}{12}$

$= \frac{7}{4}$

c) $\frac{9}{8} \div \left(\frac{3}{4} + \frac{3}{2}\right)$

$\frac{9}{8} \div \left(\frac{3}{4} + \frac{6}{4}\right)$

$\frac{9}{8} \div \frac{9}{4}$

$\frac{1}{\cancel{9}}{}_{8} \times \frac{4}{\cancel{9}}{}_{1} = \frac{4}{8}$

$= \frac{1}{2}$

d) $\frac{2}{3} \times \left(\frac{1}{8} + \frac{5}{6} - \frac{3}{4}\right)$

$\frac{2}{3} \times \left(\frac{3}{24} + \frac{20}{24} - \frac{18}{24}\right)$

$\frac{2}{3} \times \frac{5}{24} = \frac{10}{72}$

$= \frac{5}{36}$