

## Chapter 3 Review

### Section 3.1

1. What is the definition of a rational number? State 3 points.

- WRITTEN AS A FRACTION
- TERMINATING DECIMAL  
OR
- REPEATING DECIMAL

2. When we organize rational numbers like the ones shown below, what should we do before starting to order them?

- CONVERT FRACTIONS TO DECIMALS

Order the following rational numbers from least to greatest.

(No number line needed)

$$\begin{array}{ccc} \frac{7}{8} & 0.313 & \frac{9}{24} \\ \nearrow = 0.875 & & \nearrow = 0.375 \\ \frac{3}{4} & 0.88 & \\ \nearrow = 0.75 & & \end{array}$$

$$0.313 \rightarrow \frac{9}{24} \rightarrow \frac{3}{4} \rightarrow \frac{7}{8} \rightarrow 0.88$$

### Section 3.2

3. When we add rational numbers together in fraction form, what must we make sure of before doing the actual addition? State the TWO things.

- MIXED NUMBERS  $\rightarrow$  IMPROPER FRACTIONS
- FIND THE COMMON DENOMINATOR

4. How do we convert a mixed fraction into an improper fraction? Write a single sentence to describe the process.

- WHOLE # TIMES DENOMINATOR, THEN ADD TO NUMERATOR

Convert the following mixed numbers into improper fractions.

a)  $4\frac{3}{7} = 4 \times 7 + 3 = 31 \rightarrow \frac{31}{7}$

b)  $10\frac{5}{9} = 10 \times 9 + 5 = 95 \rightarrow \frac{95}{9}$

c)  $-4\frac{2}{3} = 4 \times 3 + 2 = 14 \rightarrow -\frac{14}{3}$

d)  $-8\frac{1}{7} = 8 \times 7 + 1 = 57 \rightarrow -\frac{57}{7}$

5. Add the following rational numbers together. ALWAYS place your answers in lowest (or simplified) terms.

a)  $\frac{4}{5} + \frac{1}{2} = \frac{8}{10} + \frac{5}{10} = \frac{13}{10} = 1\frac{3}{10}$

b)  $\frac{5}{7} + \left(-\frac{3}{10}\right) = \frac{50}{70} - \frac{21}{70} = \frac{29}{70}$

c)  $3\frac{1}{5} + \left(-\frac{9}{11}\right) = \frac{16}{5} - \frac{9}{11}$   
 $= \frac{176}{55} - \frac{45}{55} = \frac{131}{55} = 2\frac{21}{55}$

d)  $-\frac{3}{8} + \frac{2}{3} = -\frac{9}{24} + \frac{16}{24} = \frac{7}{24}$

e)  $-\frac{5}{9} + \left(-\frac{5}{6}\right) = -\frac{30}{54} - \frac{45}{54}$

f)  $-2\frac{7}{10} + \left(-3\frac{5}{8}\right) = -\frac{27}{10} - \frac{29}{8}$

$= -\frac{75}{54} = -1\frac{21}{54} = -1\frac{7}{18}$

$= -\frac{108}{40} - \frac{145}{40} = -\frac{253}{40} = -6\frac{13}{40}$

### Section 3.3

6. When we have negative fractions, where is the best place to write the negative sign? Why?

- NUMERATOR, BECAUSE THOSE ARE THE NUMBERS WE COMBINE

7. Subtract the following rational numbers. ALWAYS place your answers in lowest (or simplified) terms.

$$a) \frac{5}{7} - \frac{1}{3} = \frac{15}{21} - \frac{7}{21} = \boxed{\frac{8}{21}}$$

$$b) \frac{3}{2} - \frac{6}{5} = \frac{15}{10} - \frac{12}{10} = \boxed{\frac{3}{10}}$$

$$c) -1\frac{4}{7} - \frac{1}{2} = -\frac{11}{7} - \frac{1}{2} \\ = -\frac{22}{14} - \frac{7}{14} = -\frac{29}{14} = \boxed{-2\frac{1}{14}}$$

$$d) 2\frac{3}{8} - (-1\frac{4}{5}) = \frac{19}{8} + \frac{9}{5} \\ = \frac{95}{40} + \frac{72}{40} = \frac{167}{40} = \boxed{4\frac{7}{40}}$$

$$e) -2\frac{3}{7} - \frac{1}{6} = -\frac{17}{7} - \frac{1}{6} \\ = -\frac{102}{42} - \frac{7}{42} = -\frac{109}{42} = \boxed{-2\frac{25}{42}}$$

$$f) -1\frac{1}{2} - (-\frac{3}{5}) = -\frac{3}{2} + \frac{3}{5} \\ = -\frac{15}{10} + \frac{6}{10} = \boxed{-\frac{9}{10}}$$

### Section 3.4

8. When we multiply rational numbers, what should we try and do BEFORE actually doing the multiplication? How exactly do we do this?

- SIMPLIFY FRACTIONS, LOOK FOR A COMMON FACTOR IN ONE DENOMINATOR & ONE NUMERATOR.

9. When we have a whole number by itself, how do we make it compatible with multiplying fractions?

- WRITE THE WHOLE # OVER 1.  $7 = \frac{7}{1}$

10. Multiply the following rational numbers. ALWAYS place your answers in lowest (or simplified) terms.

$$a) \frac{4}{13} \times \frac{1}{2} = \frac{4}{26} = \boxed{\frac{2}{13}}$$

↘  
÷ 2

$$b) -\frac{4}{12} \times \frac{9}{10} = -\frac{36}{120} = \boxed{-\frac{3}{10}}$$

↘  
÷ 12

$$c) 1\frac{2}{6} \times \frac{2}{4} = \frac{8}{6} \times \frac{2}{4} = \frac{2}{6} \times \frac{2}{1}$$

$$= \frac{4}{6} = \boxed{\frac{2}{3}}$$

$$d) 9\frac{1}{6} \times \left(-\frac{4}{5}\right) = \frac{55}{6} \times \frac{-4}{5}$$

$$= \frac{11}{3} \times \frac{-2}{1} = -\frac{22}{3} = \boxed{-7\frac{1}{3}}$$

$$e) \frac{14}{15} \times 3 = \frac{14}{15} \times \frac{3}{1} = \frac{14}{5} \times \frac{1}{1}$$

$$= \frac{14}{5} = \boxed{2\frac{4}{5}}$$

$$f) -5\frac{2}{3} \times \left(-1\frac{5}{7}\right) = -\frac{17}{3} \times \frac{-12}{7}$$

$$= \frac{-17}{1} \times \frac{-4}{7} = \frac{68}{7} = \boxed{9\frac{5}{7}}$$

### Section 3.5

11. When we divide rational numbers, describe what we do in the initial steps.

- CHANGE ÷ TO X, FLIP SECOND FRACTION

12. When do we attempt to simplify the fractions?

- AFTER WE KISS & FLIP

13. Divide the following rational numbers. ALWAYS place your answers in lowest (or simplified) terms.

$$\begin{aligned} \text{a) } 1\frac{1}{2} \div \frac{5}{7} &= \frac{3}{2} \div \frac{5}{7} \\ &= \frac{3}{2} \times \frac{7}{5} = \frac{21}{10} = \boxed{2\frac{1}{10}} \end{aligned}$$

$$\begin{aligned} \text{b) } -4\frac{1}{5} \div \frac{4}{7} &= -\frac{21}{5} \div \frac{4}{7} = -\frac{21}{5} \times \frac{7}{4} \\ &= -\frac{147}{20} = \boxed{-7\frac{7}{20}} \end{aligned}$$

$$\begin{aligned} \text{c) } \frac{8}{9} \div 6 &= \frac{8}{9} \div \frac{6}{1} = \frac{8}{9} \times \frac{1}{6} \\ &= \frac{8}{54} = \boxed{\frac{4}{27}} \end{aligned}$$

$$\begin{aligned} \text{d) } 4\frac{3}{4} \div 7\frac{3}{5} &= \frac{19}{4} \div \frac{38}{5} = \frac{19}{4} \times \frac{5}{38} \\ &= \frac{1}{4} \times \frac{5}{2} = \boxed{\frac{5}{8}} \end{aligned}$$

$$\begin{aligned} \text{e) } -5\frac{3}{4} \div \left(-1\frac{2}{3}\right) &= -\frac{23}{4} \div -\frac{5}{3} \\ &= -\frac{23}{4} \times -\frac{3}{5} = \frac{69}{20} = \boxed{3\frac{9}{20}} \end{aligned}$$

$$\begin{aligned} \text{f) } 7\frac{4}{5} \div \left(-2\frac{1}{3}\right) &= \frac{39}{5} \div -\frac{7}{3} \\ &= \frac{39}{5} \times -\frac{3}{7} = -\frac{117}{35} = \boxed{-3\frac{12}{35}} \end{aligned}$$

### Section 3.6

14. If there are brackets inside brackets, how do you proceed in solving the question?

- WORK FROM INSIDE OUT

15. What does an exponent tell us to do with the number to which it is attached?

- HOW MANY TIMES IT IS MULTIPLIED BY ITSELF

16. Solve the following questions involving rational numbers.

$$a) \left(\frac{2}{3} + \frac{7}{5} + \frac{11}{6}\right) \times 2\frac{1}{4} =$$

$$= \left(\frac{20}{30} + \frac{42}{30} + \frac{55}{30}\right) \times \frac{9}{4}$$

$$= \frac{117}{30} \times \frac{9}{4}$$

$$= \frac{117}{10} \times \frac{3}{4} = \frac{351}{40} = \boxed{8\frac{31}{40}}$$

$$c) \left(\frac{4}{3} - \frac{1}{2}\right) \div \frac{5}{3} \times 1\frac{3}{4} =$$

$$= \left(\frac{8}{6} - \frac{3}{6}\right) \div \frac{5}{3} \times \frac{7}{4}$$

$$= \frac{5}{6} \times \frac{3}{5} \times \frac{7}{4}$$

$$= \frac{1}{2} \times \frac{1}{1} \times \frac{7}{4} = \boxed{\frac{7}{8}}$$

$$e) \frac{3}{5} + \frac{15}{8} + \frac{3}{5} \times \frac{1}{3} = \frac{3}{5} + \frac{15}{8} + \frac{1}{5}$$

$$= \frac{3}{5} + \frac{15}{8} + \frac{1}{5}$$

$$= \frac{4}{5} + \frac{15}{8}$$

$$= \frac{32}{40} + \frac{75}{40}$$

$$= \frac{107}{40} = \boxed{2\frac{27}{40}}$$

$$g) 2 \div 3\frac{4}{5} + \left(2\frac{2}{3}\right)^2 =$$

$$\frac{2}{1} \div \frac{19}{5} + \left(\frac{8}{3}\right)^2$$

$$= \frac{2}{1} \div \frac{19}{5} + \left(\frac{64}{9}\right)$$

$$= \frac{2}{1} \times \frac{5}{19} + \frac{64}{9}$$

$$= \frac{10}{19} + \frac{64}{9}$$

$$= \frac{90}{171} + \frac{1216}{171}$$

$$= \frac{1306}{171} = \boxed{7\frac{106}{171}}$$

$$b) \left(3\frac{7}{10} - \frac{11}{7}\right) \times \frac{8}{5} - 1\frac{1}{7} = \left(\frac{37}{10} - \frac{11}{7}\right) \times \frac{8}{5} - \frac{8}{7}$$

$$= \left(\frac{259}{70} - \frac{110}{70}\right) \times \frac{8}{5} - \frac{8}{7}$$

$$= \frac{149}{70} \times \frac{8}{5} - \frac{8}{7} = \frac{149}{35} \times \frac{4}{5} - \frac{8}{7}$$

$$= \frac{596}{175} - \frac{8}{7} = \frac{596}{175} - \frac{200}{175} = \frac{396}{175} = \boxed{2\frac{46}{175}}$$

$$d) 1\frac{7}{8} \times \left[\left(\frac{7}{5}\right)^2 + 2\right] =$$

$$= \frac{15}{8} \times \left[\left(\frac{7}{5}\right)^2 + \frac{2}{1}\right]$$

$$= \frac{15}{8} \times \left[\frac{49}{25} + \frac{50}{25}\right]$$

$$= \frac{15}{8} \times \frac{99}{25} = \frac{3}{8} \times \frac{99}{5} = \frac{297}{40} = \boxed{7\frac{17}{40}}$$

$$f) \left(\frac{7}{4} \times \frac{1}{7}\right) \div \left(2\frac{1}{4} - 2\frac{1}{8}\right) =$$

$$= \left(\frac{1}{4}\right) \div \left(\frac{9}{4} - \frac{17}{8}\right)$$

$$= \left(\frac{1}{4}\right) \div \left(\frac{18}{8} - \frac{17}{8}\right)$$

$$= \frac{1}{4} \div \frac{1}{8}$$

$$= \frac{1}{4} \times \frac{8}{1} = \frac{8}{4} = \boxed{2}$$

$$h) 2 \times \left(\frac{3}{2}\right)^2 - \frac{11}{7} =$$

$$= \frac{2}{1} \times \frac{9}{4} - \frac{11}{7}$$

$$= \frac{1}{1} \times \frac{9}{2} - \frac{11}{7}$$

$$= \frac{9}{2} - \frac{11}{7}$$

$$= \frac{63}{14} - \frac{22}{14}$$

$$= \frac{41}{14} = \boxed{2\frac{13}{14}}$$