

Name: _____

UNIT 1 LEARNING GUIDE – NUMERACY

INSTRUCTIONS:

Using a pencil, complete the following questions as you work through the related lessons. Show ALL of your work as is explained in the lessons. Do your best and always ask questions if there is anything that you don't understand.

1.1 NUMBER STRATEGIES

1. Use the mental math strategy of rounding (for example: +1/-1, +2/- 2, +10/-10, or +20/-20) to add the following numbers. Write down how you would change the numbers in your head for each question.

Ex. $27 + 51$ $28 + 50 = 78$

c. $580 + 355$

a. $41 + 16$

d. $174 + 620$

b. $79 + 14$

e. $378 + 210$

2. Use the mental math strategy of expanding (splitting into place values) to add the following numbers. Write down how you would change the numbers in your head for each question.

Ex. $53 + 28$ $50 + 3$
 $20 + 8$
 $70 + 11 = 81$

c. $147 + 312$

a. $14 + 43$

d. $655 + 343$

b. $38 + 48$

e. $238 + 517$

3. Use the mental math strategy of your choice to subtract the following numbers. Write down how you would change the numbers in your head for each question.

a. $65 - 23$

d. $72 - 36$

b. $89 - 72$

e. $92 - 65$

c. $58 - 24$

f. $45 - 26$

4. List at least three specific tips from the *Strategy for Solving Word Problems* video that you will use when you solve word problems.

5. Match the phrase with the correct math operation.

- | | |
|------------------|---|
| _____ \div | a. triple the guests |
| _____ $-$ | b. 3 cm longer |
| _____ $\div 2$ | c. combined total of animals |
| _____ \times | d. the average grade |
| _____ $+ 3$ | e. half the speed |
| _____ $\times 3$ | f. the product of the length and the height |
| _____ $+$ | g. 3 fewer points than |
| _____ $\div 3$ | h. the difference in weight |
| _____ $- 3$ | i. split between 3 friends |

6. Show all of the problem-solving steps that you use to solve the following words problems.

- a. Three friends earned \$765 mowing lawns over four days. They decide to split the earnings evenly. How much does each person receive?

- b. Rowan ran 5 km on Saturday and 3 km on Sunday. Deeksha ran triple Rowan's total distance but needed to pause 4 times during her run. How far did Deeksha run?
- c. Antonio pays \$8.99 per month for a subscription to a music streaming service and \$11.99 for a video streaming service. The rate for the music streaming service will be increasing by \$1.50 per month. What will the new total be for his subscription fees each month?
- d. Wei has prepared a playlist of 46 songs for the school dance. The dance starts at 7pm and the principal said that it must be over at 9pm. Assuming that each song is 3 minutes long, how many songs will Wei have to remove from his playlist?
- e. Throughout the summer vacation, Cheyenne hopes to read 12 books. So far she has read the first 5 Harry Potter books, all 3 books in the Divergent trilogy, two books by John Green as well as the book *Three Day Road*. How many more books does she have to read to reach her goal?
- f. The adventure club is going on a hike to an incredible alpine viewpoint. A total of 34 people, including the chaperones and drivers, are going on the trip. The club needs to rent vans to drive to the trailhead. If each van can hold 9 people, how many vans will they need to rent?

1.2 GREATEST COMMON FACTOR/LOWEST COMMON DENOMINATOR (GCF/LCD)

1. Circle all of the prime numbers. *Reminder: Prime numbers only have 2 factors.*

5	12	3	7	20	6	1
13	10	4	2	9	31	14

2. Circle all of the composite numbers. *Reminder: Composite numbers have more than 2 factors.*

15	2	16	17	29	27	8
10	0	9	6	11	3	20

3. Put a circle around the numbers that are neither prime nor composite.

4	1	10	12	0	9	16
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4. Find all of the factors of each number.

Ex. 14 $14 = \underline{7} \times \underline{2}$ Factors: $1, 2, 7, 14$
 $14 = \underline{14} \times \underline{1}$

a. 12 $12 = \underline{\quad} \times \underline{\quad}$ Factors: _____
 $12 = \underline{\quad} \times \underline{\quad}$
 $12 = \underline{\quad} \times \underline{\quad}$

b. 24

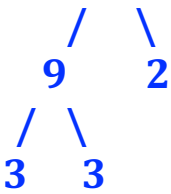
c. 45

d. 100

e. 21

5. Find all of the **prime** factors of each number and then write the prime factorization for that number. Use a factor tree to determine your answer.

Ex. 18



Prime Factorization: $2 \times 3 \times 3$

a. 12

c. 72

b. 28

d. 104

6. Match the divisibility rule to the factor.

- | | | |
|-------|-----------------|---|
| _____ | Divisible by 4 | a. Number ends in 0 or 5 |
| _____ | Divisible by 3 | b. The last 2 digits of the number are divisible by 4 |
| _____ | Divisible by 10 | c. The sum of the digits of the number is divisible by 3 |
| _____ | Divisible by 5 | d. Number is divisible by both 2 and 3 |
| _____ | Divisible by 2 | e. Number ends in 0, 2, 4, 6, or 8 (ie. an even number) |
| _____ | Divisible by 6 | f. Number ends in 0 |

7. Find and circle the factors of each number below by using divisibility rules.

280						
is divisible by						
2	3	4	5	6	10	

84						
is divisible by						
2	3	4	5	6	10	

375						
is divisible by						
2	3	4	5	6	10	

653						
is divisible by						
2	3	4	5	6	10	

916						
is divisible by						
2	3	4	5	6	10	

4530						
is divisible by						
2	3	4	5	6	10	

8. Find the Greatest Common Factor of each of these pairs of numbers. Use the **listing method** for these questions

a. 12, 30 Factors of 12 _____

 Factors of 30 _____

 GCF _____

b. 9, 15

c. 22, 11

d. 20, 25

9. Find the Greatest Common Factor of each of these pairs of numbers. Use the prime factorization method for these questions. *Reminder: To find the prime factorization for a number, you need to create a factor tree.* Show the factor tree for each number.
- a. 18, 24

Prime Factorization of 18 _____

Prime Factorization of 24 _____

Multiplication of common prime numbers _____

GCF _____

- b. 112, 42

- c. 72, 108

- d. 176, 550

10. Write out the first six multiples of each number.

Ex. 4 4, 8, 12, 16, 20, 24

a. 9 _____

b. 22 _____

c. 13 _____

11. Find the Lowest Common Multiple for each set of numbers. Use the listing of multiples method.

a. 4, 6

Multiples of 4 _____

Multiples of 6 _____

LCM _____

b. 9, 7

c. 12, 18

12. Find the Lowest Common Multiple for each set of numbers. Use the prime factorization method. Show the factor tree for each number. *Reminder: When multiplying the factors of both numbers together, common factors of both numbers are only represented once.*

a. 15, 12

Prime Factorization of 15 _____

Prime Factorization of 12 _____

Multiplication of factors _____

LCM _____

b. 22, 6

c. 36, 54

d. 40, 35

13. Natalie has 30 hazelnuts and 40 almonds. She wants to put them in equal groupings without leaving any out. What is the largest number of groups she can make? *Hint: You are asked to divide the numbers into smaller amounts – LCM or GCF?*

14. Two trains leave the station at 9 am, but on different tracks. One train blows its whistle every 12 minutes and the other blows its whistle every 9 minutes. After their initial whistle blowing when leaving the station, at what time will the trains blow their whistles again at the exact same time? *Hint: You are asked about an event that keeps reoccurring – LCM or GCF?*
15. The Math Counts Club had a party at school. There were 42 slices of pizza and 105 candies to be shared equally. The pizza and candies were divided evenly among the students and there was nothing left over. How many students could have been at the party? *Hint: There is more than one answer, find all of the possibilities.*
16. At the movie theatre, they give out a free drink to every 25th customer and a free bag of popcorn to every 10th customer. On Monday, 200 customers came to the theatre. How many people received both free items?

1.3 INTEGERS

1. Name as many examples as you can of when integers (whole positive and negative numbers) are used in real life.

2. Order the integers from least to greatest.

Least	→	Greatest		
-7	-3	-2	1	7

Ex. -3, 1, 7, -2, -7

a. 0, -4, -1, 8, -8

b. 5, -6, 2, -3, -10

c. -12, -6, -19, 0, -3,

3. Rewrite these problems without the brackets. You do not need to solve the problem.

Ex. $3 + (+2)$
 $3 + 2$

c. $3 - (+2)$

f. $20 - (+43)$

a. $3 - (-2)$

d. $5 - (-9)$

g. $(-15) - (+10)$

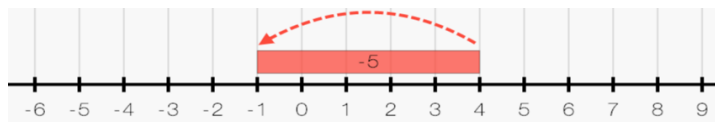
b. $3 + (-2)$

e. $(-8) + (-3)$

h. $(-650) + (+75)$

4. Use a number line to solve these problems. Reminders: First rewrite the problem without the brackets, then solve. Go left on the number line for subtraction. Go right on the number line for addition.

Ex. $4 - (+5)$
 $4 - 5$



a. $6 + (-3)$

b. $(-2) + (+7)$

c. $5 - (-2)$ _____

d. $(-4) + (-1)$ _____

e. $(-1) - (+6)$ _____

5. Solve. Reminder: First rewrite the problem without the brackets, then solve. Use a number line if you wish.

a. $7 + (-3)$

d. $6 - (+7)$

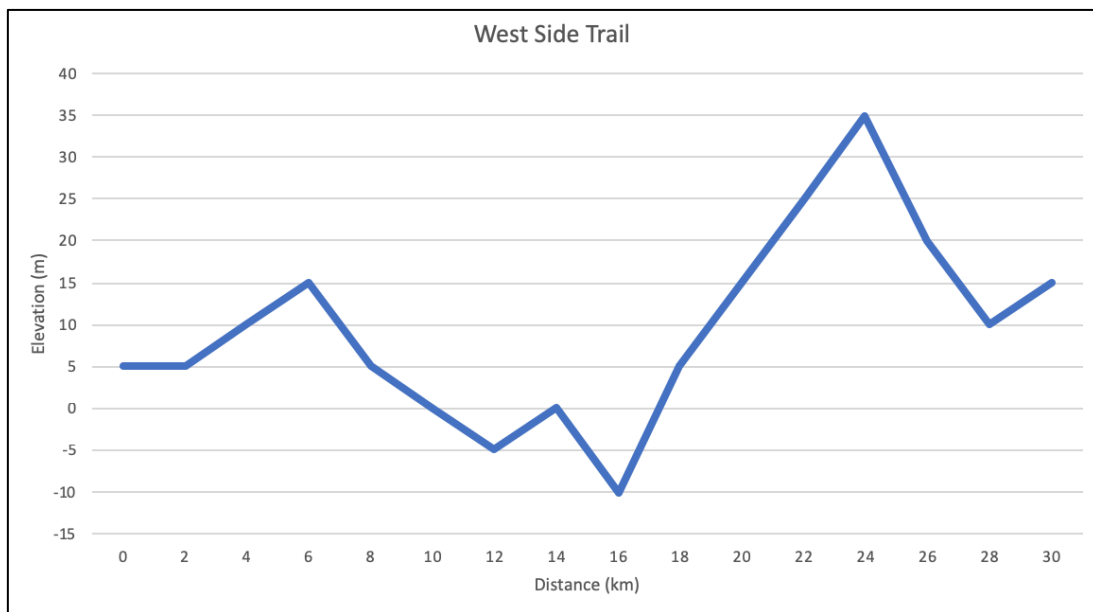
b. $4 - (-5)$

e. $(-5) + (-4)$

c. $(-7) - (+4)$

f. $8 + (+4)$

6. Georgia and Paul went for a mountain bike ride on the West Side Trail. The graph below shows the elevation profile of the trail. Use the graph to answer the following questions.



- a. What is the maximum elevation of the trail? _____
- b. What is the elevation of the lowest point of the trail? _____
- c. What is the change in elevation between kilometre 6 and kilometre 12? Write an equation to solve the question.
- d. What is the change in elevation between kilometre 16 and kilometre 24? Write an equation to solve the question.
- e. What is the cumulative elevation of the trail? (The sum of the elevation gain of all of the ascending sections of the trail.)

7. Add a positive or a negative sign into the equation to make the multiplication true.

- Ex.** $(- 1) \times (+ 3) = (- 6)$ c. $(\quad) 2) \times (- 7) = (+ 14)$
- a. $(\quad) 4) \times (- 8) = (- 32)$ d. $(- 15) \times (\quad) 3) = (- 45)$
- b. $(+ 5) \times (+ 6) = (\quad) 30)$ e. $(+ 4) \times (- 12) = (\quad) 48)$

8. Multiply. *Hint: Figure out if the answer will be a positive or a negative, then multiply the numbers.*

- a. $(+5) \times (-7)$
- b. $(-30) \times (-2)$
- c. $(-9) \times (+9)$
- d. $(+8) \times (+6)$
- e. $(-4) \times (-10)$
- f. $(+11) \times (-3)$

9. Divide. *Reminder: The rules for dividing with integers are the same as for multiplying with integers: first, figure out if the answer will be a positive or a negative, then divide the numbers.*

- a. $(+20) \div (-5)$
- b. $(-12) \div (-2)$
- c. $(+36) \div (+6)$
- d. $(-75) \div (+3)$
- e. $(+18) \div (-6)$
- f. $(-56) \div (-7)$

10. Match the word problem with the expression that describes the situation, then solve.

- | | |
|---|--------------------------|
| a. _____ Lana withdrew \$50 from her bank account every week for 4 weeks. How much did she withdraw in total? | i. $(+50) \times (+4)$ |
| b. _____ Li ran a 50m sprint 4 times in a row. How far did he run in total? | ii. $(-50) \div (+4)$ |
| c. _____ Tanjeet had a fishing lure 50 feet below the surface of the lake and then he lowered the line by 4 more feet. How far below the surface is the fishing lure now? | iii. $(-50) \times (+4)$ |
| d. _____ Serenity spent a total of \$50 on coffee over a period of 4 weeks. How much did she spend per week (she spent the same amount each week)? | iv. $(-50) + (-4)$ |

11. Without completing the multiplications and divisions, determine whether the answer will be positive or negative. Reminder: An even number of negatives will result in a positive answer; an odd number of negatives will result in a negative answer.

- | | |
|-----------------------------|--|
| Ex. $(+4)(-2)(-1)$ + | c. $(-10) \div (+2)(+1)(-1)$ |
| a. $(-3)(-3) \div (2)$ | d. $(-5)(-1)(+2)(+2)(-1)$ |
| b. $(-2)(-2)(-3)(+1)$ | e. $(+20) \div (-5) \div (-2) \div (+1)$ |

12. First determine whether the result will be positive or negative, then calculate the answer.

- | | |
|-------------------------------|-------------------------------------|
| a. $(+4)(-3)(-1)$ | d. $(100) \div (-2)(1)(-1)$ |
| b. $(-25) \div (-5)(-2)$ | e. $(-5)(-1)(-2)(-2)(-1)$ |
| c. $(+8) \div (-2) \div (+2)$ | f. $(+40) \div (+10)(-2) \div (-4)$ |

1.4 BEDMAS WITH INTEGERS & DECIMALS

1. Solve. Rewrite the problem after each step to determine what is left to calculate.

Ex. $(-4)(+5) + (-6)$

$$\begin{array}{c} \swarrow \quad \searrow \\ -20 + (-6) \\ \swarrow \quad \searrow \\ -26 \end{array}$$

c. $(2)(-2) - 3$

a. $(-9) + 10 \times 4$

d. $4 \div [5 + (-7)]$

b. $[8 + (-5)] \times (-4)$

e. $[(-10) + 8] \times (-7)$

2. When solving problems that include a division line like this: $\frac{7-(4)(-2)}{(-30)-(-25)}$, what must you do to the top and bottom parts of the problem?

3. Solve.

a. $\frac{8+(-36)}{(-4)+18}$

c. $\frac{(-4)[8+(-2)]}{3-(-3)}$

b. $\frac{(-8)+(-2)(5)}{(2-5) \times (-3)}$

d. $\frac{(-7)(9)+3}{6 \times [(-7)+5]}$

4. Solve.

a. $8.8 \div 4 + (1.5 - 0.4)$

c. $4.3 + (-0.8) \div [1.3 + (-0.9)]$

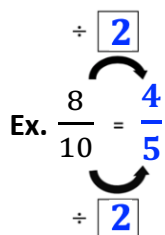
b. $(-2.5)(4) - (-3.75)$

d. $[4 + (-6.2)] \div (0.1 \times 4)$

1.5 INTRODUCTION TO FRACTIONS

1. Reduce each fraction to its lowest terms. *Reminder: Find the number by which you can divide both the numerator and the denominator. If you get an answer that can still be reduced, repeat the process.*

Ex. $\frac{8}{10} = \frac{4}{5}$



c. $\frac{18}{45}$

a. $\frac{9}{12}$

d. $\frac{55}{77}$

b. $\frac{14}{35}$

e. $\frac{75}{225}$

2. Connect each improper fraction and mixed number on the left with its equivalent on the right.

- | | | |
|----|-----------------|-----------------|
| a. | $1\frac{3}{4}$ | $2\frac{3}{4}$ |
| b. | $\frac{31}{2}$ | $\frac{72}{48}$ |
| c. | $\frac{11}{4}$ | $\frac{14}{8}$ |
| d. | $\frac{36}{16}$ | $15\frac{1}{2}$ |
| e. | $1\frac{1}{2}$ | $2\frac{1}{4}$ |
| f. | $2\frac{1}{3}$ | $\frac{21}{9}$ |

3. Which one is bigger? Add a *less than* (<) or *more than* (>) symbol between the sets of numbers to show which number is bigger. *Hint: You will need to have the numbers in the same format in order to accurately compare them.*

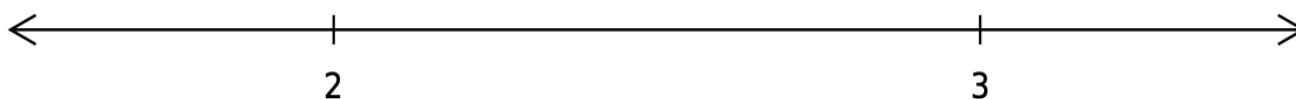
Ex. $2\frac{5}{9} < \frac{24}{9}$ $2\frac{5}{9} = \frac{23}{9}$ c. $5\frac{1}{6}$ $\frac{17}{3}$
 $\frac{23}{9} < \frac{24}{9}$

a. $3\frac{1}{4}$ $\frac{11}{4}$ d. $\frac{45}{8}$ 6

b. $\frac{43}{10}$ $4\frac{2}{10}$ e. $\frac{64}{9}$ $7\frac{5}{9}$

4. Place the following fractions on the number line: $\frac{5}{2}$ $2\frac{2}{3}$ $\frac{13}{6}$ $\frac{11}{4}$ $2\frac{1}{4}$

Reminder: In order to compare fractions, you need to find a common denominator. Use that denominator to show the increments on the number line.



1.6 MULTIPLYING FRACTIONS

1. Fill in the blanks.

- a. When you multiply a whole number by a whole number, the answer is always _____ than the original number. Ex. $4 \times 5 = 20$
- b. When you multiply a proper fraction by a proper fraction, the answer is always _____ than the original number. Ex. $\frac{1}{4} \times \frac{1}{5} = \frac{1}{20}$

2. Multiply the following fractions. *Reminder: You need to multiply the numerators together and the denominators together. Convert to a mixed number when possible.*

Ex. $\frac{5}{3} \times \frac{2}{3} = \frac{5 \times 2}{3 \times 3} = \frac{10}{9} = 1\frac{1}{9}$

d. $5 \times \frac{4}{7}$

a. $\frac{1}{4} \times \frac{5}{6}$

e. $\frac{10}{3} \times \frac{6}{5}$

b. $\frac{9}{2} \times \frac{1}{4}$

f. $\frac{8}{9} \times \frac{11}{3}$

c. $\frac{3}{8} \times \frac{3}{10}$

g. $8 \times \frac{5}{3}$

3. Simplify the following fractions, then multiply. *Reminder: Always state the answer in its simplest terms.*

Ex. $\frac{2}{6} \times \frac{1}{3} = \frac{\cancel{2}}{3\cancel{6}} \times \frac{1}{3} = \frac{1}{9}$

c. $\frac{2}{3} \times \frac{4}{10}$

a. $\frac{5}{6} \times \frac{3}{9}$

d. $\frac{5}{6} \times \frac{2}{3}$

b. $\frac{15}{2} \times \frac{5}{3}$

e. $6 \times \frac{7}{3}$

f. $\frac{16}{9} \times \frac{3}{40}$

h. $\frac{4}{27} \times \frac{9}{2}$

g. $\frac{30}{20} \times \frac{4}{12}$

i. $\frac{12}{5} \times \frac{4}{3}$

4. Solve the following word problems and express your answer as a fraction. *Reminder: Show all of your work. Drawing a picture can be helpful to get started on word problems.*

a. There are 24 marbles in a bag: $\frac{2}{16}$ of the marbles are red, $\frac{1}{8}$ of the marbles are blue, $\frac{1}{4}$ of the marbles are yellow, $\frac{1}{3}$ of the marbles are black, and $\frac{1}{6}$ of the marbles are silver. How many of each type of marble are there?

b. In Ms. Oak’s class $\frac{5}{12}$ of the students wear glasses, $\frac{2}{9}$ of the students wear earrings, $\frac{2}{18}$ of the students wear hats, and $\frac{1}{4}$ of the students wear a watch. No one wears more than one of these items. There are 4 students that wear hats.

a. How many students are in Ms. Oak’s class?

b. Determine how many students wear each type of item.

Glasses	Earrings	Hats	Watch

- c. Georgia spent $1\frac{7}{8}$ of an hour practicing her trombone. She spent $\frac{1}{5}$ of that time playing scales. How much time did she spend on scales?
- d. Thomas used a $\frac{1}{2}$ cup measure to measure the flour for his bannock. After making it, Thomas gave $\frac{2}{3}$ of the bannock to Maria. Maria then gave $\frac{1}{4}$ of her bannock to Randall. How much of the original batch of bannock did Randall get?
- e. An elder spent 10 hours tracking 5 elk. It was raining during $\frac{1}{3}$ of that time. How long was it raining?
- f. Naveah wants to cut off a large portion of her hair in order to donate it. Her hair is currently 63 cm long. She needs to donate a minimum of 45 cm, but she doesn't want to cut off more than $\frac{2}{3}$ of her hair. Is her hair long enough or will she need to grow it more before donating?

1.7 DIVIDING FRACTIONS

1. Find the reciprocal of each number.

Ex. $\frac{2}{5}$ $\frac{5}{2}$

b. 4

d. 37

a. $\frac{1}{4}$

c. $\frac{5}{12}$

e. $\frac{11}{2}$

2. Find the reciprocal of each mixed number. *Reminder: You need to convert the mixed number to an improper fraction first.*

Ex. $7\frac{5}{6}$ $\frac{47}{6} \rightarrow \frac{6}{47}$

b. $9\frac{3}{5}$

a. $10\frac{1}{4}$

c. $6\frac{7}{10}$

3. Find the reciprocal of each fraction. State your answer as a mixed number.

Ex. $\frac{6}{55}$ $\frac{55}{6} \rightarrow 9\frac{1}{6}$

b. $\frac{8}{17}$

a. $\frac{2}{11}$

c. $\frac{5}{49}$

4. Solve. *Reminder: After changing the division into a multiplication, simplify and cross-simplify the fractions before solving.*

Ex. $16 \div \frac{2}{3}$ $\frac{8\cancel{16}}{1} \times \frac{3}{\cancel{2}_1} = \frac{24}{1} =$

b. $\frac{6}{7} \div 3$

a. $24 \div \frac{3}{8}$

c. $\frac{3}{4} \div \frac{1}{8}$

d. $\frac{4}{5} \div \frac{24}{35}$

g. $\frac{8}{3} \div 6$

e. $\frac{1}{9} \div \frac{13}{6}$

h. $18 \div \frac{3}{10}$

f. $\frac{7}{2} \div \frac{14}{3}$

i. $\frac{15}{22} \div \frac{25}{42}$

5. Solve the following word problems. *Hint: First write out each problem as a division, then change it to a multiplication to solve it.*
- Avery made 6 litres of hot chocolate for the 4th annual bonfire with his family. If each cup holds $\frac{2}{7}$ of a litre of liquid, how many cups can Avery fill?
 - A jar has $\frac{3}{16}$ of a kilogram of small beads in it. Ember wants to make bead bracelets for 6 of her friends. The beads are too small to divide up by counting them. What is the weight of the beads that she can use for each bracelet, to make sure that she doesn't run out in the end?
 - Jackson wants to sell some slime at the craft fair and hopes to earn at least \$30. He has $\frac{5}{2}$ cups of slime. He needs $\frac{1}{4}$ cup of slime to fill a small container. How many containers can he fill?

1.8 MIXED NUMBERS

1. Follow each step as you fill in the following table to practice multiplying mixed numbers.

STEPS	Multiplication question	Convert to improper fractions	Simplify	Multiply	Convert to mixed number
Ex.	$5\frac{5}{6} \times 1\frac{3}{5}$	$\frac{35}{6} \times \frac{8}{5}$	$\frac{\overset{7}{\cancel{35}}}{\underset{3}{\cancel{6}}} \times \frac{\overset{8^4}{\cancel{8}}}{\underset{5_1}{\cancel{5}}}$	$\frac{28}{3}$	$9\frac{1}{3}$
a.	$4\frac{2}{5} \times 1\frac{7}{8}$				
b.	$6 \times 3\frac{3}{4}$				
c.	$3\frac{1}{3} \times 9$				

2. Follow each step as you fill in the table to practice dividing with mixed numbers.

STEPS	Division question	Convert mixed numbers to improper fractions	Convert to a multiplication and simplify	Multiply	Simplify (Convert to mixed number)
Ex.	$4\frac{2}{3} \div 2$	$\frac{14}{3} \div \frac{2}{1}$	$\frac{\overset{7}{\cancel{14}}}{3} \times \frac{1}{\underset{2_1}{\cancel{2}}}$	$\frac{7}{3}$	$2\frac{1}{3}$
a.	$5 \div 1\frac{7}{8}$				
b.	$9\frac{1}{4} \div 3\frac{3}{4}$				
c.	$4\frac{1}{3} \div \frac{1}{6}$				

3. Follow the same steps as you did above to multiply and divide the following mixed numbers.

a. $2\frac{2}{5} \times 1\frac{5}{6}$

e. $7\frac{1}{3} \div 3\frac{1}{2}$

b. $8 \div 2\frac{4}{7}$

f. $7\frac{1}{2} \times 2\frac{2}{3}$

c. $1\frac{3}{5} \times 3\frac{3}{4}$

g. $\frac{4}{5} \div 4\frac{3}{5}$

d. $4\frac{6}{9} \times 1\frac{6}{21}$

h. $6\frac{3}{4} \div 3$

4. Gerry made up 25 cups of brine with which to prepare salmon for smoking. He needs $2\frac{1}{4}$ cups of brine for each salmon that he smokes. How many salmon can he prepare with the brine that he has already made up? *Reminder: Follow the same steps as you did above for solving multiplication and division problems containing mixed numbers.*
- Will Gerry multiply 25 by $2\frac{1}{4}$ or divide 25 by $2\frac{1}{4}$ to solve this problem? Explain your answer.
 - Solve the problem.

5. The chickens at Louis' farm are fed $4\frac{1}{2}$ buckets of feed a day. How many buckets of feed are needed to get through an entire week?
- Will Louis multiply $4\frac{1}{2}$ by 7 or divide $4\frac{1}{2}$ by 7 to solve this problem? Explain your answer.
 - Solve the problem.
6. Lauren has $5\frac{3}{4}$ containers of trail mix to share with her teammates during the volleyball tournament. How many portions can she serve if each portion is $\frac{1}{8}$ of a container.
- Will Lauren multiply $5\frac{3}{4}$ by $\frac{1}{8}$ or divide $5\frac{3}{4}$ by $\frac{1}{8}$ to solve this problem? Explain your answer.
 - Solve the problem.

1.9 ADDING AND SUBTRACTING FRACTIONS

1. In your own words, explain why it is necessary for fractions to have the same denominator in order to add or subtract them. _____
- _____

2. Add the following fractions. *Reminder: Make sure your answer is in lowest terms. Improper fractions should be expressed as mixed numbers.*

Ex. $\frac{7}{10} - \frac{3}{10} = \frac{4}{10} \rightarrow \frac{2}{5}$

b. $\frac{9}{2} + \frac{3}{2}$

a. $\frac{23}{100} + \frac{37}{100}$

c. $\frac{12}{25} - \frac{7}{25}$

3. Add or subtract the following fractions. *Reminder: Fractions need to have the same denominator prior to adding or subtracting.*

Ex. $\frac{2}{3} + \frac{2}{9} = \frac{6}{9} + \frac{2}{9} = \frac{8}{9}$

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

a. $\frac{2}{3} + \frac{4}{15}$

d. $\frac{7}{10} - \frac{4}{25}$

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

e. $\frac{3}{4} - \frac{2}{9}$

4. Add or subtract the following fractions. *Reminder: All three fractions must have a common denominator.*

Ex. $\frac{8}{10} + \frac{1}{2} + \frac{3}{4} = \frac{16}{20} + \frac{10}{20} + \frac{15}{20} = \frac{41}{20} \rightarrow 2\frac{1}{20}$

c. $\frac{14}{36} + \frac{5}{8} + \frac{7}{9}$

a. $\frac{4}{5} + \frac{4}{10} + \frac{1}{2}$

d. $\frac{2}{3} + \frac{13}{15} + \frac{11}{12}$

b. $\frac{7}{8} - \frac{5}{16} - \frac{1}{4}$

e. $\frac{4}{5} - \frac{1}{6} - \frac{1}{3}$

5. Answer the following questions. Express your answers using a fraction.
- A puppy weighed $\frac{1}{3}$ kg at birth. After one week, its weight increased by $\frac{1}{4}$ kg and then it gained another $\frac{3}{8}$ kg during the second week. How much did the puppy weigh at 2 weeks old?
 - A man had a piece of leather that was $\frac{3}{4}$ metre long. He cut off $\frac{2}{5}$ metre for a project and then cut off a 30-centimetre piece to give to his friend.
 - What fraction of the original piece of leather is left?
 - How many centimeters of the leather is left?
 - After finishing her dinner, Shianne spends $\frac{26}{15}$ hours at hockey practice, 41 minutes reading, $\frac{21}{30}$ of an hour doing homework, and half an hour watching TV, then she goes to bed.
 - How much time does Shianne spend on all of her after-dinner activities?
 - If Shianne finishes dinner at 6:15pm, what time does she go to bed?

6. Follow each step as you fill in the table to practice adding and subtracting with mixed numbers.

STEPS	Question	Convert mixed numbers to improper fractions	Find lowest common denominator	Add/ Subtract	Simplify
Ex.	$2\frac{2}{3} + 4\frac{1}{9}$	$\frac{8}{3} + \frac{37}{9}$	$\frac{24}{9} + \frac{37}{9}$	$\frac{61}{9}$	$6\frac{7}{9}$
a.	$3\frac{3}{5} + 3\frac{9}{10}$				
b.	$6\frac{3}{4} - 5\frac{1}{2}$				
c.	$23\frac{1}{3} - 12$				

7. Follow the same steps as you did above to add and subtract the following mixed numbers.

a. $20\frac{1}{3} - 5\frac{8}{9}$

c. $1\frac{5}{12} + 2\frac{4}{5} + \frac{1}{4}$

b. $2\frac{1}{8} + 5\frac{1}{12}$

d. $5\frac{1}{10} + \frac{1}{2} + 2\frac{3}{25}$

8. Elias bought 5 chocolate bars on Monday. He ate $1\frac{1}{2}$ bars on Tuesday and $2\frac{2}{5}$ bars on Thursday.

a. How many chocolate bars did Elias have left for the weekend?

b. How many chocolate bars did he eat in total throughout the week?

9. Rajit's sister is $17\frac{1}{5}$ years old.

a. How old will Rajit's sister be in $2\frac{1}{2}$ years?

b. How old was Rajit's sister $4\frac{1}{3}$ years ago?

c. Rajit is $15\frac{1}{2}$. What is the age difference between Rajit and her sister?

1.10 ORDER OF OPERATIONS WITH FRACTIONS

1. Solve. *Reminder: Follow the rules for the Order of Operations.*

Ex. $\frac{2}{3} + \frac{1}{8} \times \frac{2}{9}$

$$\frac{2}{3} + \frac{1}{8} \times \frac{2}{9}$$

$$\frac{2}{3} + \frac{1}{36}$$

$$\frac{24}{36} + \frac{1}{36} = \frac{25}{36}$$

a. $\frac{1}{8} \div \frac{1}{5} + \frac{1}{2}$

b. $\frac{5}{6} - \frac{4}{9} \times \frac{5}{8}$

c. $\frac{1}{4} + \frac{1}{2} \div \frac{5}{6} \times \frac{3}{8}$

2. Solve.

a. $\left(\frac{1}{2} + \frac{3}{5}\right) \div \frac{2}{9}$

c. $\left(\frac{1}{2} + \frac{1}{3}\right) \times \frac{4}{9}$

b. $\frac{1}{5} \div \left(\frac{7}{16} - \frac{3}{8}\right)$

d. $\frac{3}{5} \times \left(\frac{1}{2} - \frac{1}{5}\right) \div \frac{7}{10}$

3. A student correctly solved the following problem. Describe what they did at each step in order to arrive at their answer.

Question:

$$2\frac{1}{3} - \left(\frac{7}{8} + 1\frac{1}{6}\right) \div 7$$

	Steps to solve:	Description of step
Ex.	$\frac{7}{3} - \left(\frac{7}{8} + \frac{7}{6}\right) \div \frac{7}{1}$	<i>Brackets first. They changed the mixed numbers to improper fractions.</i>
a.	$\frac{7}{3} - \left(\frac{21}{24} + \frac{28}{24}\right) \div \frac{7}{1}$	
b.	$\frac{7}{3} - \frac{49}{24} \div \frac{7}{1}$	
c.	$\frac{7}{3} - \frac{49}{24} \times \frac{1}{7}$	
d.	$\frac{7}{3} - \frac{7}{24}$	
e.	$\frac{56}{24} - \frac{7}{24}$	
f.	$\frac{49}{24}$	
g.	$2\frac{1}{24}$	

4. Solve.

a. $1\frac{9}{14} \div \left(4\frac{1}{6} \times \frac{3}{5}\right)$

b. $6\frac{2}{3} - 3\frac{1}{5} \times \left(\frac{4}{9} + 1\frac{1}{2}\right)$

UNIT 1 – ANSWER KEY

SECTION 1.1

1. a. 57 b. 93 c. 935 d. 794 e. 588
2. a. 57 b. 86 c. 459 d. 998 e. 755
3. a. 42 b. 17 c. 34 d. 36 e. 27 f. 19
4. Answers will vary.
5. d, h, e, f, b, a, c, i, g
6. a. \$255 b. 24 km c. \$22.48 d. 6 songs e. 1 book f. 4 vans

SECTION 1.2

1. 5, 3, 7, 13, 2, 31
2. 15, 16, 27, 8, 10, 9, 6, 20
3. 1, 0
4. a. 1, 2, 3, 4, 6, 12 b. 1, 2, 3, 4, 6, 8, 12, 24 c. 1, 3, 5, 9, 15, 45 d. 1, 2, 4, 5, 10, 20, 25, 50, 100 e. 1, 3, 7, 21
5. a. $2 \times 2 \times 3$ b. $2 \times 2 \times 7$ c. $2 \times 2 \times 2 \times 3 \times 3$ d. $2 \times 2 \times 2 \times 13$
6. b, c, f, a, e, d
7. **280**: 2, 4, 5, 10 **84**: 2, 3, 4, 6 **375**: 3, 5 **653**: none **916**: 2, 4 **4530**: 2, 3, 5, 6, 10
8. a. 6 b. 3 c. 11 d. 5
9. a. 6 b. 14 c. 36 d. 22
10. a. 9, 18, 27, 36, 45, 54 b. 22, 44, 66, 88, 110, 132 c. 13, 26, 39, 52, 65, 78
11. a. 12 b. 63 c. 36
12. a. 60 b. 66 c. 108 d. 280
13. She can make 10 groups.
14. The trains will blow their whistles together at 9:36 am.
15. There could have been 1, 3, 7, or 21 students at the party.
16. Four people receive both free items.
 1. a. 33 b. 48 c. 28 d. 62 e. 26 f. 38 g. 6
 2. a. 12 b. 30 c. 8

SECTION 1.3

1. Many possible answers. May include: temperatures, elevation, finances, sports, and health.
2. a. -8, -4, -1, 0, 8 b. -10, -6, -3, 2, 5 c. -19, -12, -6, 0, -3

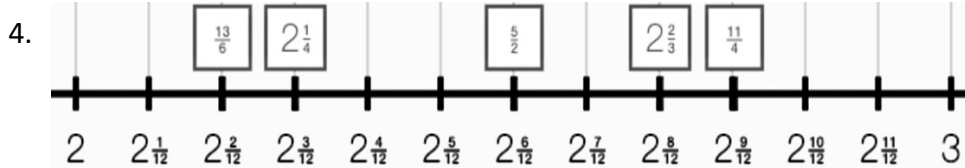
3. a. $3+2$ b. $3-2$ c. $3-2$ d. $5+9$ e. $-8-3$ f. $20-43$ g. $-15-10$ h. $-650+75$
4. a. 3 b. 5 c. 7 d. -5 e. -7
5. a. 4 b. 9 c. -11 d. -1 e. -9 f. 12
6. a. $+35m$ b. $-10m$ c. $(-5)-(+15)=-20m$ d. $(+35)-(-10)=+45m$ e. $+65m$
7. a. + b. + c. - d. + e. -
8. a. -35 b. +60 c. -81 d. +48 e. +40 f. -33
9. a. -4 b. +6 c. +6 d. -25 e. -3 f. +8
10. a. *iii*, -200 (withdrew \$200) b. *i*, +200 (ran 200m) c. *iv*, -54 (54ft below the surface)
d. *ii*, -12.5 (spent \$12.50 per week)
11. a. + b. - c. + d. - e. +
12. a. +12 b. -10 c. -2 d. +50 e. -20 f. +2

SECTION 1.4

1. a. 31 b. -12 c. -7 d. -2 e. 14
2. Treat the top and bottom as though they each are in brackets.
3. a. -2 b. -2 c. -4 d. 5
4. a. 3.3 b. -6.25 c. 2.3 d. -5.5

SECTION 1.5

1. a. $\frac{3}{4}$ b. $\frac{2}{5}$ c. $\frac{2}{5}$ d. $\frac{5}{7}$ e. $\frac{1}{3}$
2. a. $\frac{14}{8}$ b. $15\frac{1}{2}$ c. $2\frac{3}{4}$ d. $2\frac{1}{4}$ e. $\frac{72}{48}$ f. $\frac{21}{9}$
3. a. > b. > c. < d. < e. <



SECTION 1.6

1. a. larger/greater/bigger b. smaller/less than
2. a. $\frac{5}{24}$ b. $1\frac{1}{8}$ c. $\frac{9}{80}$ d. $2\frac{6}{7}$ e. 4 f. $3\frac{7}{27}$ g. $13\frac{1}{3}$
3. a. $\frac{5}{18}$ b. $12\frac{1}{2}$ c. $\frac{4}{15}$ d. $\frac{5}{9}$ e. 14 f. $\frac{2}{15}$ g. $\frac{1}{2}$ h. $\frac{2}{3}$ i. $3\frac{1}{5}$
4. a. 3 red, 3 blue, 6 yellow, 8 black, 4 silver.
b. i. 36 ii. 15 wear glasses, 8 wear earrings, 4 wear hats, and 9 wear a watch.

- c. She spent $\frac{3}{8}$ of an hour playing scales.
- d. Randall got $\frac{1}{6}$ of the original batch of bannock.
- e. It was raining for $3\frac{1}{3}$ hours.
- f. Naveah's hair is not long enough yet. She would only have 42 cm to cut off.

SECTION 1.7

1. a. 4 or $\frac{4}{1}$ b. $\frac{1}{4}$ c. $\frac{12}{5}$ d. $\frac{1}{37}$ e. $\frac{2}{11}$
2. a. $\frac{4}{41}$ b. $\frac{5}{48}$ c. $\frac{10}{67}$
3. a. $5\frac{1}{2}$ b. $2\frac{1}{8}$ c. $9\frac{4}{5}$
4. a. 64 b. $\frac{2}{7}$ c. 6 d. $1\frac{1}{6}$ e. $\frac{2}{39}$ f. $\frac{3}{4}$ g. $\frac{4}{9}$ h. 60 i. $1\frac{8}{55}$
5. a. Avery can fill 21 cups. b. Ember can use $\frac{1}{32}$ kg of beads for each bracelet. c. Jackson can fill 10 containers.

SECTION 1.8

1. a. $8\frac{1}{4}$ b. $22\frac{1}{2}$ c. 30
2. a. $2\frac{2}{3}$ b. $2\frac{7}{15}$ c. 26
3. a. $4\frac{2}{5}$ b. $3\frac{1}{9}$ c. 6 d. 6 e. $2\frac{2}{21}$ f. 20 g. $\frac{4}{23}$ h. $2\frac{1}{4}$
4. a. He will divide 25 by $2\frac{1}{4}$ to solve this problem, because he has a total amount of brine and he wants to divide that up into groups that are $2\frac{1}{4}$ cups in size. b. Gerry can prepare 11 salmon.
5. a. Luis will multiply $4\frac{1}{2}$ by 7 to solve this problem, because he knows how much feed is needed for one day and he will need that same amount 7 times to feed the chicken for one week. b. Luis needs $31\frac{1}{2}$ buckets of feed.
6. a. She will divide $5\frac{3}{4}$ by $\frac{1}{8}$ to solve this problem, because she is dividing the whole amount of trail mix into smaller portions. b. She can serve 46 portions.

SECTION 1.9

1. You cannot add fractions that have different sized parts.
2. a. $\frac{3}{5}$ b. 6 c. $\frac{1}{5}$
3. a. $\frac{14}{15}$ b. $\frac{12}{25}$ c. $1\frac{1}{18}$ d. $\frac{27}{50}$ e. $\frac{19}{36}$
4. a. $1\frac{7}{10}$ b. $\frac{5}{16}$ c. $1\frac{19}{24}$ d. $2\frac{9}{20}$ e. $\frac{3}{10}$
5. a. The puppy weighed $\frac{23}{24}$ kg at 2 weeks old. b. i) There is $\frac{1}{20}$ m left. ii) 5cm c. i) Shianne spends $3\frac{37}{60}$ hours (or 3 hrs, 37 min) doing her activities. ii) Shianne would go to bed at 9:52pm.
6. a. $7\frac{1}{2}$ b. $1\frac{1}{4}$ c. $11\frac{1}{3}$
7. a. $14\frac{4}{9}$ b. $7\frac{5}{24}$ c. $4\frac{7}{15}$ d. $7\frac{18}{25}$
8. a. Elias had $1\frac{1}{10}$ chocolate bars left. b. He ate $3\frac{9}{10}$ chocolate bars during the week.
9. a. Rajit's sister will be $19\frac{7}{10}$ years old. b. She was $12\frac{13}{15}$ years old. c. There is $1\frac{7}{10}$ years age difference between Rajit and her sister.

1.10

1. a. $1\frac{1}{8}$ b. $\frac{5}{9}$ c. $\frac{19}{40}$
2. a. $4\frac{19}{20}$ b. $3\frac{1}{5}$ c. $\frac{10}{27}$ d. $\frac{9}{35}$
3. a. Find common denominator for addition.
b. Addition.
c. Division next. Change division into multiplication and simplify.
d. Multiplication.
e. Find common denominator for subtraction.
f. Subtraction
g. Simplify by changing to a mixed number.
4. a. $\frac{23}{35}$ b. $\frac{4}{9}$