Unit One – Algebraic Thinking (Part B – Solving Equations)	
7.2 Solving Equations	***I can solve real-world and mathematical problems by writing and solving addition or subtraction equations.**

Discuss with your group – how do you THINK you would solve the equation?

30 = 12 + k

You can use *inverse operations* to solve equations. **Inverse operations** "undo" each other. Addition and subtraction are **inverse operations**.

Show What I Know:

Name the ***inverse operation*** you can use to solve the equation.

1.	**2.**	**3.**
x - 8 = 12	n + 3 = 13	33 = b + 14
inverse operation is addition	**inverse operation is subtraction**	**inverse operation is subtraction**

Tell whether the given value is a solution of the equation.

4.	**5.**	**6.**
x + 42 = 85 ; x = 43	19 - g = 7 ; g = 15	w + 23 = 41 ; w = 28
43 + 42 = 85 Yes	**19 – 15 ≠ 7 No**	**28 + 23 ≠ 41 No**

Solve the equation showing inverse operation. Check your solution.

7.	**8.**	**9.**
y - 7 = 3	25 = q + 14	a + 5.5 = 17.3
+ 7 + 7	**-14 -14**	**-5.5 -5.5**
y = 10	**11 = q**	**a = 11.8**
check:	***check:***	***check:***
10 – 7 = 3	**25 = 11 + 14**	**11.8 + 5.5 = 17.3**

Unit One – Algebraic Thinking (Part B – Solving Equations)	
1.1 Whole Number Operations	***I can add, subtract, multiply, and divide multi-digit whole numbers.**

Discuss with your group – what operation would you use to solve?

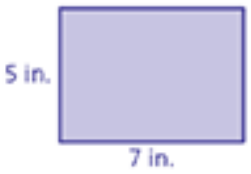
A go-kart holds 4 riders. If there are 11 friends in your group, how many go-karts would you need?

Determine the **operation** you would use to solve the problem.

	Operation	*Work*
1. Gymnastic lessons cost $30 per week. How much will 18 weeks of gymnastic lessons cost?	**Multiplication**	18 x 30 540 dollars
2. The scores on your first two tests were 82 and 93. By how many points did your score improve?	**Subtract**	93 - 82 11 points
3. You are setting up tables for a banquet for 150 guests. Each table seats 12 people. What is the minimum number of tables you will need?	**Division**	12 r 6 12) 150 -12 30 — 13 tables -24 6
4. A store has 15 boxes of peaches. Each box contains 45 peaches. How many peaches does the store have?	**Multiplication**	45 x 15 225 + 450 675 peaches
5. Two shirts cost $18 and $25. What is the total cost of the shirts?	**Addition**	18 + 25 43 dollars

Find the perimeter and area of the rectangle.

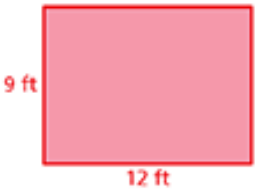
6.



Perimeter: _____
(2•L + 2•W)

Area: _____
(L • W)

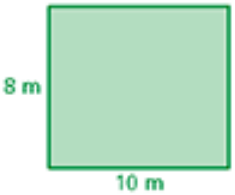
7.



Perimeter: _____

Area: _____

8.

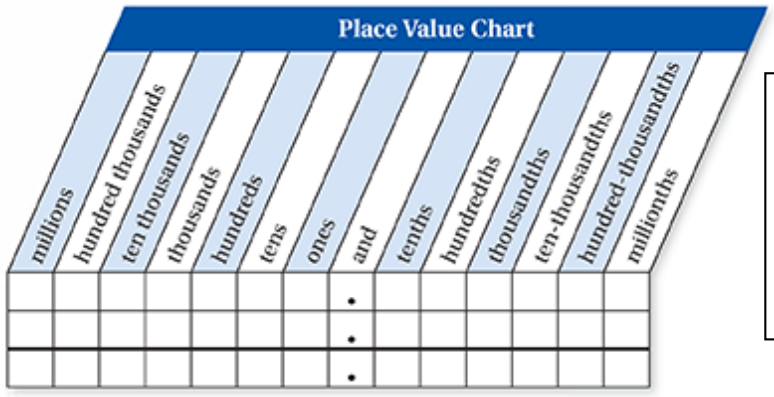


Perimeter: _____

Area: _____

Unit One – Algebraic Thinking (Part B – Solving Equations)	
2.4 Add and Subtract Decimals	***I can add and subtract decimals.**

Discuss with your group – how do you THINK you would solve?
A historical landmark has a width of 50.9 meters and a length of 618.44 meters. What is the perimeter of the pool?



1) Line up the decimals.
2) Add zeroes where necessary.
3) Add or subtract.

1) 4.206 + 10.85	*2)* 6.34 - 5.33	*3)* 15.5 + 8.229	*4)* 27.9 - 0.905
4.206 + 10.850 15.056	6.34 - 5.33 1.01	15.500 + 8.229 23.729	27.900 - 0.905 26.995

5) You work 1.15 hours on English homework and 1.75 hours on math homework. Your science homework takes 1.05 hours less than your math homework. How many hours do you work on homework?

English = 1.15 hours
Math = 1.75 hours
Science = (1.75 – 1.05) hours = 0.70 hours

1.15
1.75
+ 0.70
3.60 hours

Unit One – Algebraic Thinking (Part B – Solving Equations)	
1.4 Prime Factorization	***I can find the product of the prime factors of a number.**

Discuss with your group – how do you THINK you would solve?

What strategies can you use to find the factors of 42?

A number is divisible by. . .	
2	if the last digit is even (0, 2, 4, 6, or 8).
3	if the sum of the digits is divisible by 3.
4	if the last two digits form a number divisible by 4.
5	if the last digit is 0 or 5.
6	if the number is divisible by both 2 and 3
9	if the sum of the digits is divisible by 9.
10	if the last digit is 0.

Divisibility Rules

Prime Number – a whole number greater than one, with exactly two factors (1 and itself)

Composite Number – a whole number greeter than one, with factors other than 1 and itself

Use the divisibility rules to list the factor pairs of the number.

15	24	42
1 x 15	1 x 24	1 x 42
3 x 5	2 x 12	2 x 21
	3 x 8	3 x 14
	4 x 6	6 x 7

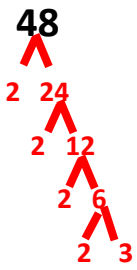
Prime Factorization – a composite number written as a product of its prime factors.

Factor Trees – use factor pairs to help find the prime factorization of a number. The tree ends with all prime factors.

The prime factorization of 48 is

$2^4 \times 3$

Write the prime factorization of 48.
(Start with 2's, 3's, and 5's)



48 = 2 x 2 x 2 x 2 x 3

Use divisibility rules to determine whether the number is divisible by 2, 3, 5, 6, 9, and 10.

1044	1485	1620
2 , 3 , 4 , 6 , 9	3 , 5 , 9	2 , 3 , 4 , 5 , 6 , 9 , 10

List the factor pairs of the number.

45	54	61
1 x 45	1 x 54	1 x 61 (61 is prime)
3 x 15	2 x 27	
5 x 9	3 x 18	

Write the prime factorization of the number.

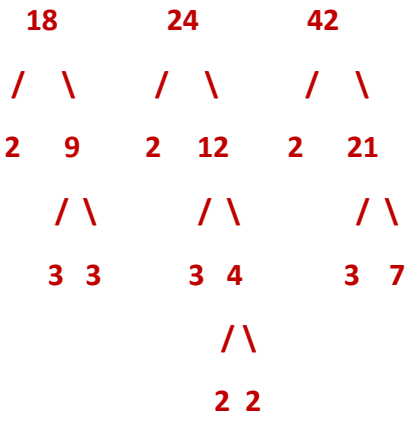
26	**54**	**77**
2 x 13	2 x 3 x 3 x 3	7 x 11

Unit One – Algebraic Thinking (Part B – Solving Equations)	
1.5 Greatest Common Factor	***I can find the greatest common factor of two whole numbers less than or equal to 100.**

Discuss with your group – how do you THINK you would solve?

Find the Greatest Common Factor (GCF) of 24 and 39

- Use factor trees to write the **prime factorization** of each number.
  (Remember to write prime factors least to greatest.)
- Line up the matching factors in columns.
- Multiply the common factors.



18 = 2 x 3 x 3
24 = 2 x 3 x 2 x 2
42 = 2 x 3 x 7

GCF = 2 x 3= 6

45, 60	**27, 63**	**12, 15, 30**
45 - 3 | 3 | 5 60 - 2 | 2 | 3 | 5 GCF = 3 x 5 = **15**	27 - 3 | 3 | 3 63 - 3 | 3 | | 7 GCF = 3 x 3 = **9**	12 - 2 | 2 | 3 15 - 3 | 5 30 - | 2 | 3 | 5 GCF = **3**

Unit One – Algebraic Thinking (Part B – Solving Equations)	
1.6 Least Common Multiple	***I can find the least common multiple of two whole numbers less than or equal to 12.**

Discuss with your group – how do you THINK you would solve?

Find the Least Common Multiple (LCM) of 8 and 10

- Use factor trees to write the **prime factorization** of each number.
  (Remember to write prime factors least to greatest.)
- Line up the matching factors in columns.
- Multiply one factor from each column.

Find the LCM of 16 and 20.

Step 1: Make a factor tree for each number.

Step 2: Write the prime factorization, lining up the common prime factors.

16 -| 2 | 2 | 2 | 2 |
20 -| 2 | 2 | | | 5 |

Bring down one factor from each column: 2 x 2 x 2 x 2 x 5

Step 3: Multiply. LCM = 80

Find the LCM of the numbers by using the prime factorization.

9, 12 **9: 3 | 3** **12: 2 | 2 | 3** **LCM = 2 x 2 x 3 x 3 = 36**	**15, 27** **15: 3 | 5** **27: 3 | 3 | 3** **LCM = 3 x 3 x 3 x 5 = 135**	**10, 12, 15** **10: 2 | 5** **12: 2 | 2 | 3** **15: 3 | 5** **LCM = 2 x 2 x 3 x 5 = 60**

Unit One – Algebraic Thinking (Part B – Solving Equations)	
1.6 Ext Add & Subtract Fractions	***I can add and subtract fractions.**

Discuss with your group – how do you THINK you would solve?

Find the Least Common Denominator (LCD) of 8 and 10

Find $\frac{5}{8}+\frac{1}{6}$

Find the LCM of the denominators.

8 -| 2 | 2 | 2 |
6 -| 2 | | | 3 |

LCM= 2 • 2 • 2 • 3 = 24.

So, the LCD is 24.

$$\frac{5}{8}+\frac{1}{6}=\frac{5\cdot3}{8\cdot3}+\frac{1\cdot4}{6\cdot4}$$

$$=\frac{15}{24}+\frac{4}{24}$$

$$=\frac{19}{24}$$

Use the LCD to rewrite the fractions with the same denominator.

1) $\frac{1}{6},\frac{3}{8}$ LCD is 24

$\frac{1}{6}=\frac{4}{24}$, $\frac{3}{8}=\frac{9}{24}$

2) $\frac{5}{12},\frac{2}{9}$ LCD is 36

$\frac{5}{12}=\frac{15}{36}$, $\frac{2}{9}=\frac{8}{36}$

Copy and complete the statement using < , > , or = . (*Cross multiply, bottom to top!*)

18 ☐ 16

$\frac{3}{4}$ ☐ $\frac{4}{6}$ **>**

$\frac{10}{11}$ **>** $\frac{5}{6}$

$2\frac{2}{5}$ **=** $\frac{24}{10}$

Add or Subtract. (Find the least common denominator.) Write answer in simplest form.

$\frac{3}{5}+\frac{7}{10}$

$\frac{6}{10}+\frac{7}{10}$

$\frac{13}{10}=1\frac{3}{10}$

$\frac{2}{3}-\frac{3}{5}$

$\frac{10}{15}-\frac{9}{15}$

$\frac{1}{15}$

Unit One – Algebraic Thinking (Part B – Solving Equations)	
7.3 Solving Equations (x or÷)	***I can solve real-world and mathematical problems by writing and solving multiplication or division equations.**

Discuss with your group – how do you THINK you would solve?
m ÷ 12 = 10

Solve the equation. Check your solution.

1) $\frac{w}{4} = 12$ • 4

w = 48

2) $\frac{7}{2} \cdot \frac{2}{7} x = 6 \cdot \frac{7}{2}$

w = $\frac{42}{2}$ = 21

3) $\frac{a}{8} = 6$ • 8

w = 48

4) 2 • 3z ÷ 2 = 9 • 2

3z = 18
3 3
z = 6

INVERSE of divide is multiply!!

Solve the equation. Check your solution.

5) $\frac{5b}{5} = \frac{65}{5}$

b = 13

6) $\frac{p \cdot 3}{3} = \frac{18}{3}$

p = 6

7) $\frac{12q}{12} = \frac{60}{12}$

q = 5

8) $\frac{81}{9} = \frac{9r}{9}$

9 = r

INVERSE of multiply is divide!!

Unit One – Algebraic Thinking (Part B – Solving Equations)	
2.5 Multiplying Decimals	***I can multiply decimals.**

Discuss with your group – how do you THINK you would solve?

Find the product of 7.2 and 0.352

What Will I Learn:

Mutliplying Decimals.

- Line up the factors to the right. *You do NOT line up the decimals.*
- Underline all digits after the decimal.
- Multiply as if it they were whole numbers.
- Count the number of places after the decimal in the problem.
- The product has the same number of decimal places.

3.9 1 ← *3 places underlined in problem*
x 0. 2
.7 8 1 ← *3 places underlined in product*

Show What I Know:

Multiply.

$$\begin{array}{r} 5 \\ 4.8 \\ \times \quad 7 \\ \hline 33.6 \end{array}$$

(One digit was behind the decimal in the problem, so we moved the decimal in one place from the end in the final answer.)

$$\begin{array}{r} 1 \\ 7.12 \\ \times \quad 15 \\ \hline 3560 \\ +7120 \\ \hline 106.80 \end{array}$$

(Two digits were behind the decimal in the problem, so we moved the decimal in two places from the end in the final answer.)

$$\begin{array}{r} 7.91 \\ \times \quad .72 \\ \hline 1582 \\ +5537 \\ \hline .7119 \end{array}$$

(Four digits were behind the decimal in the problem, so we moved the decimal in four places from the end in the final answer.)

A car can travel 22.36 miles on one gallon of gasoline. How far can the car travel on 8.5 gallons of gasoline?

$$\begin{array}{r} 22.36 \\ \times \quad 8.5 \\ \hline 11180 \\ +178880 \\ \hline 190.060 \end{array}$$

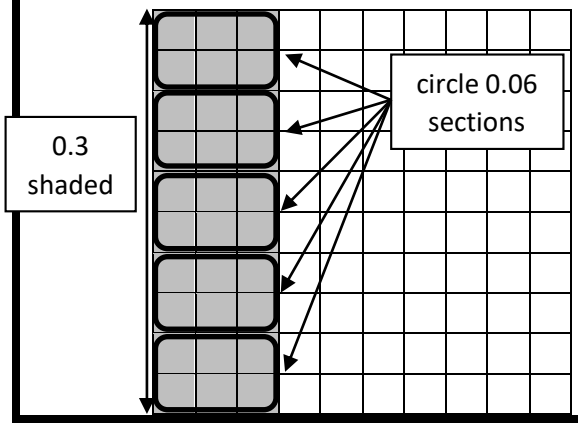
Unit One – Algebraic Thinking (Part B – Solving Equations)

2.6 Dividing Decimals	***I can divide decimals.**

Discuss with your group – how do you THINK you would solve?

Find the quotient of 7.2 and 0.8.

Model 0.3 ÷ .06



How many 0.06 sections are in 0.3?

0.3 ÷ 0.06 = _____

What Will I Learn:

Dividing decimals by whole numbers.

$$\begin{array}{r} 1.83 \\ 4\overline{)7.32} \\ -4 \\ \hline 33 \\ 32 \\ \hline 12 \\ 12 \\ \hline 0 \end{array}$$

- Rocket the decimal into the quotient.
- Divide as you would with whole numbers.
- Continue until there is no remainder.

You may need to add zeroes to dividend.

$$\begin{array}{r} 0.35 \\ 7\overline{)2.45} \\ -21 \\ \hline 35 \\ -35 \\ \hline 0 \end{array}$$

Dividing decimals by decimals.

$$\begin{array}{r} 366. \\ 0.02\overline{)7.32.} \\ -6 \\ \hline 13 \\ 12 \\ \hline 12 \\ 12 \\ \hline 0 \end{array}$$

- Move the decimals to the end in the divisor.
- Move the decimal the same number of places in the dividend.
- Rocket the decimal into the quotient.
- Divide as you would with whole numbers.
- Continue until there is no remainder.

You may need to add zeroes to dividend.

$$\begin{array}{r} 4.9 \\ .5\overline{)2.45} \end{array}$$

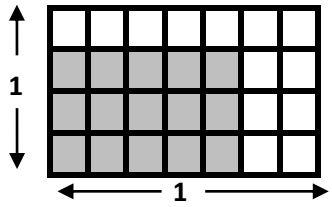
9.6 ÷ 1.2	0.459 ÷ 0.51
$\begin{array}{r} 8. \\ 1.2\overline{)9.6} \end{array}$	$\begin{array}{r} .9 \\ 0.51\overline{)0.459} \end{array}$

Unit One – Algebraic Thinking (Part B – Solving Equations)	
2.1 Multiplying Fractions	***I can multiply fractions.**

Discuss with your group – how do you THINK you would solve?

Find the product of $\frac{2}{5}$ and $\frac{1}{2}$.

The product of what two fractions is represented by the shaded region in the diagram below? What is the product? How do you know?



$\frac{3}{4}$ _____ x $\frac{5}{7}$ _____ = $\frac{15}{28}$ _____

You can simplify before multiplying:

$\frac{\cancel{8}^{2}}{\cancel{9}_{3}} \times \frac{\cancel{3}^{1}}{\cancel{4}_{1}} = \frac{2}{3}$

$\frac{5}{10} \times \frac{2}{15} = \frac{10}{150} = \frac{1}{15}$

Find $1\frac{4}{5} \times 3\frac{2}{3}$.

$1\frac{4}{5} \times 3\frac{2}{3} = \frac{9}{5} \times \frac{11}{3}$ Write $1\frac{4}{5}$ and $3\frac{2}{3}$ as improper fractions.

$= \frac{\cancel{3}^{3} \times 11}{5 \times \cancel{3}_{1}}$ Multiply fractions. Divide out the common factor 3.

$= \frac{33}{5}$, or $6\frac{3}{5}$ Simplify.

$1\frac{7}{8} \times 2\frac{2}{5} =$

$\frac{\cancel{15}^{3}}{\cancel{8}_{2}} \times \frac{\cancel{12}^{3}}{\cancel{5}_{1}} = \frac{9}{2} = 4\frac{1}{2}$

1)

$\frac{1}{6} \times \frac{5}{8} = \frac{5}{48}$

2)

$\frac{\cancel{7}^{1}}{\cancel{9}_{3}} \times \cancel{3}^{1} = \frac{7}{3} = 2\frac{1}{3}$

3)

$\frac{\cancel{8}^{1}}{\cancel{9}_{3}} \times \frac{\cancel{3}}{5} = \frac{8}{15}$

4)

$\frac{7}{8} \times 2\frac{1}{3}$

$\frac{7}{8} \times \frac{7}{3} = \frac{49}{24} = 2\frac{1}{24}$

5)

$7 \times 3\frac{9}{14}$

$\frac{\cancel{7}}{1} \times \frac{51}{\cancel{14}} = \frac{51}{2} = 25\frac{1}{2}$

6)

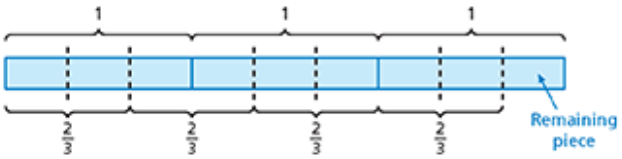
$5\frac{5}{9} \times 2\frac{7}{10}$

$\frac{\cancel{50}}{\cancel{9}} \times \frac{\cancel{27}}{\cancel{10}} = \frac{15}{1} = 15$

Unit One – Algebraic Thinking (Part B – Solving Equations)	
2.2 Dividing Fractions	***I can divide two fractions.**

Discuss with your group – how do you THINK you would solve?

Find the quotient of $\frac{1}{2}$ and $\frac{1}{3}$.



Write the division problem and solve it using a model.

a. How many two-thirds are in three?

The division problem is ____3 ÷ $\frac{2}{3}$_____.

How many whole groups of 2/3 are in 3? _____4_____

The remaining piece represents ____$\frac{1}{2}$_____ of 2/3.

So, there are __4 $\frac{1}{2}$_____ groups of 2/3 in 3.

Two numbers whose product is 1 are **reciprocals**.

To write the **reciprocal** of a number, write the number as a fraction.

Then **invert** the fraction. So the reciprocal of $\frac{a}{b}$ *is* $\frac{b}{a}$.

Original Fraction	Reciprocal	Check
$\frac{3}{7}$	$\frac{7}{3}$	$\frac{3}{7} \cdot \frac{7}{3} = 1$
$\frac{9}{5}$	$\frac{5}{9}$	$\frac{9}{5} \cdot \frac{5}{9} = 1$
2	$\frac{1}{2}$	$\frac{2}{1} \cdot \frac{1}{2} = 1$

To divide a number by a fraction, **multiply** the number by the **reciprocal** of the fraction. $\frac{7}{10} \div \frac{3}{5}$

- Change the divisor to the **reciprocal**
- Change the sign to **multiply**

$$\frac{7}{10} \cdot \frac{5}{3} = \frac{35}{30} = 1\frac{1}{6}$$

$\frac{2}{7} \div \frac{1}{3}$ $\frac{2}{7} \cdot \frac{3}{1} = \frac{6}{7}$	$\frac{1}{2} \div \frac{1}{8}$ $\frac{1}{2} \cdot \frac{8}{1} = \frac{8}{2} = 4$	$\frac{3}{7} \div 6$ $\frac{3}{7} \div \frac{6}{1}$ $\frac{3}{7} \cdot \frac{1}{6} = \frac{3}{42} = \frac{1}{14}$	$\frac{5}{8} \div 4$ $\frac{5}{8} \div \frac{4}{1}$ $\frac{5}{8} \cdot \frac{1}{4} = \frac{5}{32}$

Unit One – Algebraic Thinking (Part B – Solving Equations)	
2.3 Dividing Mixed Numbers	***I can divide mixed numbers.**

Discuss with your group – how do you THINK you would solve?

Find the quotient of $1\frac{5}{8} \div \frac{2}{3}$

Change mixed numbers to improper fractions.

Change divisors to reciprocals.

Cancel and multiply.

1) $1\frac{3}{7} \div \frac{2}{3}$ $\frac{10}{7} \div \frac{2}{3}$ $\frac{10}{7} \times \frac{3}{2} = \frac{15}{7} = 2\frac{1}{7}$	*2)* $2\frac{1}{6} \div \frac{3}{4}$ $\frac{13}{6} \div \frac{3}{4}$ $\frac{13}{6} \times \frac{4}{3} = \frac{15}{7} = 2\frac{1}{7}$	*3)* $8\frac{1}{4} \div 1\frac{1}{2}$ $\frac{33}{4} \div \frac{3}{2}$ $\frac{33}{4} \times \frac{2}{3} = \frac{11}{2} = 5\frac{1}{2}$