Standards of Learning Content Review Notes

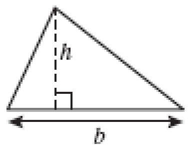
Grade 6 Mathematics
1st Nine Weeks, 2015-2016

SUFFOLK
PUBLIC SCHOOLS

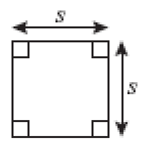
Revised September 2015

Grade 6 Mathematics Formula Sheet
2009 *Mathematics Standards of Learning*

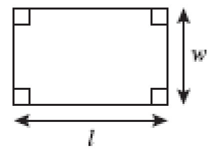
Geometric Formulas



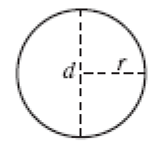
$$A = \frac{1}{2}bh$$



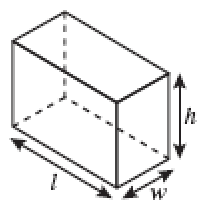
$$p = 4s$$
$$A = s^2$$



$$p = 2l + 2w$$
$$A = lw$$



$$C = 2\pi r$$
$$C = \pi d$$
$$A = \pi r^2$$



$$V = lwh$$
$$S.A. = 2lw + 2lh + 2wh$$

Pi

$$\pi \approx 3.14$$
$$\pi \approx \frac{22}{7}$$

Abbreviations

milligram	mg
gram	g
kilogram	kg
milliliter	mL
liter	L
kiloliter	kL
millimeter	mm
centimeter	cm
meter	m
kilometer	km
square centimeter	cm^2
cubic centimeter	cm^3

ounce	oz
pound	lb
quart	qt
gallon	gal.
inch	in.
foot	ft
yard	yd
mile	mi.
square inch	sq in.
square foot	sq ft
cubic inch	cu in.
cubic foot	cu ft

Area	A
Circumference	C
Perimeter	p
Surface Area	$S.A.$
Volume	V

Mathematics:
Content Review Notes

Grade 6 Mathematics: First Nine Weeks
2015-2016

This resource is intended to be a guide for parents and students to improve content knowledge and understanding. The information below is detailed information about the Standards of Learning taught during the 1st grading period and comes from the *Mathematics Standards of Learning Curriculum Framework, Grade 6* issued by the Virginia Department of Education. The Curriculum Framework in its entirety can be found at the following website.

http://www.doe.virginia.gov/testing/sol/frameworks/mathematics_framewks/2001/framewks_math6.pdf

SOL 6.1
The student will describe and compare data, using ratios, and will use appropriate notations, such as a/b, a to b, and a:b.

A ratio is a comparison of any two quantities and conveys an idea that cannot be expressed as a single number. A ratio is used to represent a variety of relationships within a set and between two sets.

A ratio can be written using a fraction ($\frac{2}{3}$), a colon (2:3), or the word *to* (2 to 3).

A ratio can compare part of a set to the entire set (part-whole comparison).

Example: Joseph has 10 coins in his pocket. He has 4 dimes, 2 quarters, 2 nickels, and 2 pennies. What is the ratio of dimes to the total number of coins?

ANSWER: Joseph has 4 dimes and 10 total coins. This can be written in three different ways:

4:10 4 to 10 $\frac{4}{10}$

Sometimes, simplified answers are required. Simplify by finding the greatest common factor (GCF) and then divide the numerator AND the denominator by the GCF.

Example: $\frac{4}{10} \div \frac{2}{2} = \frac{2}{5}$

Using the example above, the answer would be: 2:5 2 to 5 $\frac{2}{5}$

A ratio can compare part of a set to another part of the same set (part-part comparison).

Example: Joseph has 10 coins in his pocket. He has 4 dimes, 2 quarters, 2 nickels, and 2 pennies. What is the ratio of quarters to dimes?

ANSWER: Joseph has 2 quarters and 4 dimes. This can be written in three different ways:

2:4 2 to 4 $\frac{2}{4}$

If simplified, the answer would be: 1:2 1 to 2 $\frac{1}{2}$

A ratio can compare part of a set to a corresponding part of another set (part-part comparison).

Example: The table shows the number of coins two boys have in their pockets.

	Dimes	**Quarters**	**Nickels**
Joseph	4	2	2
Kendrick	3	1	6

What is the ratio of the number of quarters Joseph has compared to the number of quarters Kendrick has?

ANSWER: Joseph has 2 quarters and Kendrick has 1 quarter. This can be written in three different ways:

2:1 2 to 1 $\frac{2}{1}$

A ratio can compare all of a set to all of another set (whole-whole comparison).

Example: The table shows the number of coins two boys have in their pockets.

	Dimes	**Quarters**	**Nickels**
Joseph	4	2	2
Kendrick	3	1	6

What is the ratio of the number of coins Joseph has compared to the number of coins Kendrick has?

ANSWER: Joseph has 8 coins and Kendrick has 10 coins. This can be written in three different ways:

8:10 8 to 10 $\frac{8}{10}$

If simplified, the answer would be: 4:5 4 to 5 $\frac{4}{5}$

A ratio is a multiplicative comparison of two numbers, measures, or quantities.
All fractions are ratios.

SOL Practice Items provided by the VDOE,
http://www.doe.virginia.gov/testing/sol/standards_docs/mathematics/index.shtml
Answers are located on the last page of the booklet.

SOL 6.1 (Ratios)

1. According to the table, which shows the ratio of the number of red calculators to the number of blue calculators?

Calculators in Mrs. Camp's Class

Color	Number
Red	14
Blue	8
Yellow	6

A $\frac{14}{8}$

B $\frac{8}{14}$

C $\frac{14}{28}$

D $\frac{8}{20}$

2. The ratio of boys to girls in room B is 15 to 12. What is the ratio of girls to total students in room B?

A 12 to 27
B 12 to 15
C 15 to 27
D 15 to 12

3. According to the table, what is the ratio of number of A's Camella earned to the number of B's she earned?

Camelia's Grades

Grade	Number Earned
A	4
B	3
C	1

A 4:7
B 3:4
C 7:4
D 4:3

4. There are 30 red marbles and 150 blue marbles in a box. What is the ratio of blue marbles to red marbles?

A $\frac{180}{30}$

B $\frac{30}{80}$

C $\frac{150}{30}$

D $\frac{30}{150}$

5. Sam owns a canoe rental company with 120 boats. He has 55 wood boats and the rest are fiberglass. What is the ratio of wood boats to fiberglass boats?

A 55:65
B 65:55
C 120:55
D 120:65

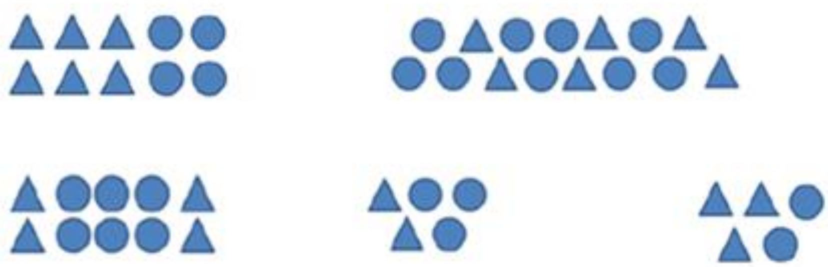
6. There are 24 fiction books and 36 nonfiction books on a shelf. Select the three ratios that represent the number of fiction books to the total number of books on the shelf.

$\frac{3}{5}$	2 to 3	2 : 5
2 to 5	2 : 3	3 to 5
3 : 5	$\frac{2}{5}$	$\frac{2}{3}$

7. Using the picture below.

a) Write the ratio of 6 shirts to 5 pants using three different notations.
b) Represent the ratio of shirts to pants using numbers other than 6 and 5.

8. Identify each picture that has a ratio of 2:3 for the number of triangles to the number of circles.



SOL 6.2
The student will

a) **investigate and describe fractions, decimals and percents as ratios;**
b) **identify a given fraction, decimal or percent from a representation;**
c) **demonstrate equivalent relationships among fraction, decimals, and percents (No calculator)**
d) **compare and order fractions, decimals and percents. (No calculator)**

- A **ratio** can compare part of a set to the entire set (part-whole comparison)

A fraction can be defined as a number written with the bottom part (the denominator) telling you how many parts the whole is divided into, and the top part (the numerator) telling how many you have. In other words a fraction is a **ratio** comparing a part to a whole.

A decimal is a fraction where the denominator (the bottom number) is a power of ten (such as 10, 100, 1000, etc).

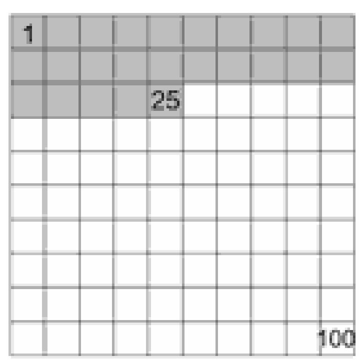
A decimal is a **ratio** comparing a part to a whole.

$\frac{43}{100}$ = 0.43 43 parts to 100

$\frac{51}{1000}$ = 0.051 51 parts to 1000

- Percent means parts per 100. A percent is a **ratio** comparing the number of parts to 100.

  Example: 25% means a ratio of shaded parts to total parts



Fractions, decimals, and percents are three different representations of the same number.

Percent means "per 100" or how many "out of 100"; *percent* is another name for *hundredths*.

A number followed by a percent symbol (%) is equivalent to that number with a denominator of 100.

Example: $30\% = \frac{30}{100} = \frac{3}{10} = 0.3$

Percents can be expressed as fractions with a denominator of 100.

Example: $75\% = \frac{75}{100} = \frac{3}{4}$

Percents can be expressed as decimals.

Example: $38\% = \frac{38}{100} = 0.38$

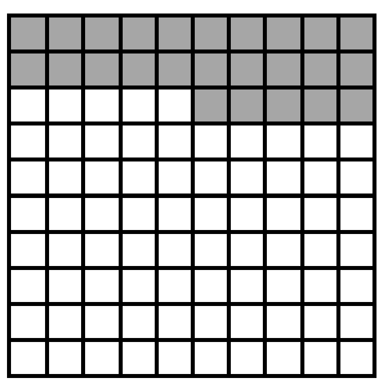
A fraction can be rewritten as an equivalent fraction with a denominator of 100, and, thus, as a decimal or percent.

Example: $\frac{3}{5} = \frac{60}{100} = 0.60 = 60\%$

Decimals, fractions, and percents can be represented using concrete materials (e.g., base-10 blocks, decimal squares, or grid paper).

Percents should be represented by drawing a shaded region on a 10-by-10 grid to represent a given percent.

Example: The 10-by-10 grid shows 25%.



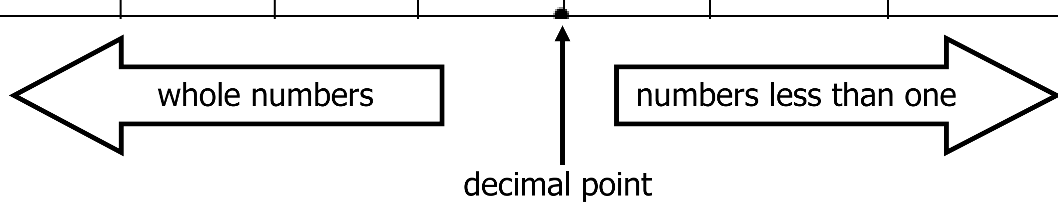
Percents are used in real life for taxes, sales, data description, and data comparison.

The decimal point is a symbol that indicates the location of the ones place and all other subsequent place values in the decimal system.

The decimal point separates a whole number amount from a number that is less than one.

Place Value Chart (decimals to thousandths)

Thousands	Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths



To order fractions, decimals and percents convert to the same form.

Examples:

Which list is in order from greatest to least?

A) $\frac{1}{5}$, 0.166 , 16%

B) 0.166 , $\frac{1}{5}$, 16%

C) $\frac{1}{5}$, 16% , 0.166

D) 16% , 0.166 , $\frac{1}{5}$

$\frac{1}{5}$	$.2\underline{00}$	20%
.166	.166	16.6%
16%	$.16\underline{0}$	16%

The answer is A.

Which list is in order from least to greatest?

A) $\frac{3}{7}, \frac{4}{5}, \frac{5}{11}$

B) $\frac{4}{5}, \frac{5}{11}, \frac{3}{7}$

C) $\frac{5}{11}, \frac{3}{7}, \frac{4}{5}$

D) $\frac{3}{7}, \frac{5}{11}, \frac{4}{5}$

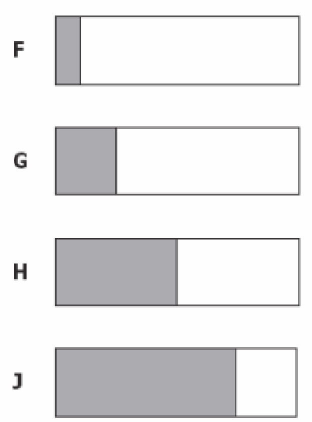
$\frac{3}{7}$	.43	43%
$\frac{4}{5}$	.80	80%
$\frac{5}{11}$	$.\overline{45}$	45%

The answer is D.

SOL Practice Items provided by the VDOE,
http://www.doe.virginia.gov/testing/sol/standards_docs/mathematics/index.shtml
Answers are located on the last page of the booklet.

SOL 6.2 (Fraction, Decimals, and Percents)

1. Which of the following figures most closely shows 25% shaded?



2. Which number is equivalent to 30%?

F 0.03

G $\frac{3}{10}$

H $\frac{1}{3}$

J 30.0

3. Which is true?

F $\frac{7}{11} \geq \frac{5}{6}$ **H** $\frac{3}{10} < \frac{4}{9}$

G $\frac{2}{5} < \frac{3}{8}$ **J** $\frac{5}{12} \geq \frac{4}{7}$

4. Which of the following is true?

A $0.310 < 0.275$

B $0.325 > 0.310$

C $0.325 < 0.275$

D $0.310 > 0.325$

5. Which percent is equivalent to $\frac{3}{5}$?

A 15%

B 20%

C 35%

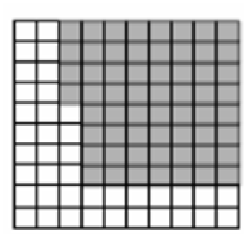
D 60%

6. Which statement is true?

A $\frac{3}{4} > \frac{7}{12}$ **C** $\frac{3}{8} > \frac{6}{11}$

B $\frac{2}{3} > \frac{6}{7}$ **D** $\frac{1}{5} > \frac{1}{4}$

7. Which represents the part of the 10 by 10 grid that is shaded?



F $\frac{1}{2}$

G $\frac{3}{5}$

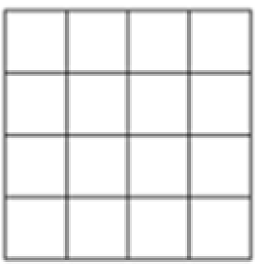
H $\frac{7}{10}$

J $\frac{3}{4}$

8. **Which decimals are ordered from least to greatest?**

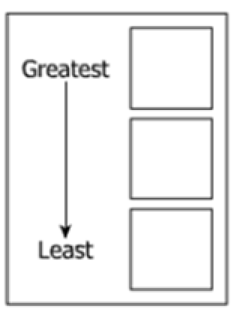
A 0.009, 0.8, 0.05, 1.0
B 0.009, 0.05, 0.8, 1.0
C 1.0, 0.05, 0.8, 0.009
D 1.0, 0.8, 0.05, 0.009

9. **This model represents 1 whole and is divided into equal parts.**
Shade this model to represent $\frac{3}{8}$ of this whole.



10. **Arrange the numbers in order from least to greatest.**

10%	$\frac{7}{10}$	0.09



11. **Select each number that can be placed in the blank to make this statement true.**

$$\frac{3}{5} = \underline{\ ?\ }$$

35%	0.60	0.35	60%	3.50	0.06

12. **Which ratio is equivalent to 4.2?**

a) $\frac{21}{5}$ b) $\frac{17}{4}$ c) $\frac{42}{100}$ d) $\frac{21}{42}$

13. **What ratio is equivalent to 0.3%?**

14. **Which number could represent point *K*?**

a) 0.08 b) $\frac{8}{10}$ c) 0.8% d) $\frac{3}{8}$

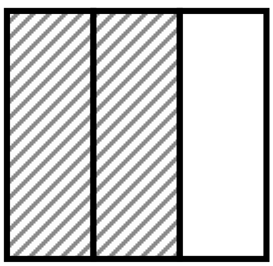
15. **Select all of the given numbers that lie between 0.01 and 0.10 on the number line.**

0.015	0.31	0.023	0.002
0.004	0.50	0.049	0.205

SOL 6.4
The student will demonstrate multiple representations of multiplication and division of fractions.

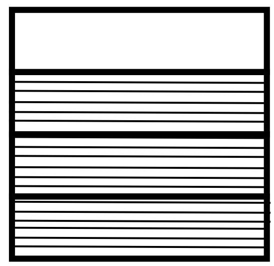
- When multiplying a fraction by a fraction such as $\frac{2}{3} \bullet \frac{3}{4}$, we are asking for part of a part.

Below is an example of how this can be represented using models.



$\frac{2}{3}$

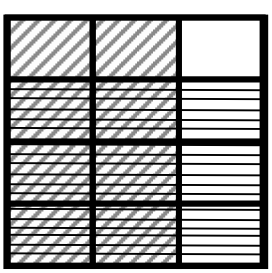
This represents two thirds (the shaded portion).



$\frac{3}{4}$

This represents three fourths (the shaded portion).

In order to represent the multiplication of fractions visually, we use the 2 shaded grids above, which represent the two fractions we are multiplying. Place the representations on top of each other (as shown below). The shaded area where the 2 grids overlap represents the product of the two fractions.

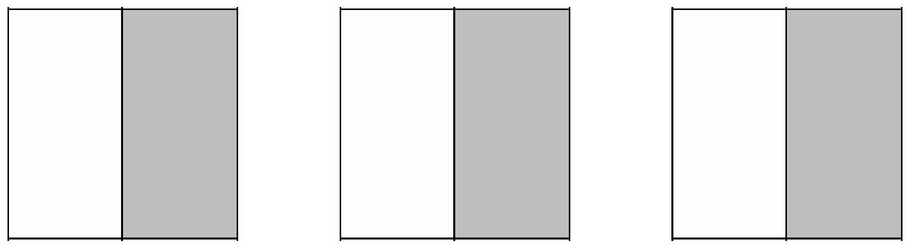


The two grids overlap in 6 out of the 12 blocks.

$\frac{2}{3}$ X $\frac{3}{4}$ = $\frac{6}{12}$ = $\frac{1}{2}$ (Always remember to simplify your answer.)

- When multiplying a fraction by a whole number such as $\frac{1}{2} \bullet 3$, we are trying to find a part of the whole.

Below is an example of how this can be represented using models.



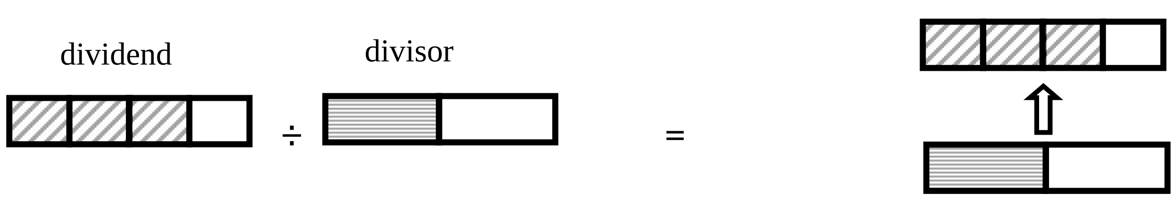
This represents one half (the shaded portion).	This represents one half (the shaded portion).	This represents one half (the shaded portion).

The images above show one half of each box shaded and there are three boxes. $\frac{1}{2}$ added three times is $1\frac{1}{2}$.

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

What does it mean to divide with fractions? For measurement division, the divisor is the number of groups and the quotient will be the number of groups in the dividend. **Division of fractions can be explained as how many of a given divisor is needed to equal the given dividend**. In other words, for $\frac{3}{4} \div \frac{1}{2}$ the question is, "How many $\frac{1}{2}$ make $\frac{3}{4}$?"

For partition division the divisor is the size of the group, so the quotient answers the question, "How much is the whole?" or "How much for one?" divisors will fit into a dividend. Note the models below.



This reads ¾ divided by ½. In other words, how many one halves will fit into ¾?

You can visually see that **one** ½ and **half** another ½ will fit into ¾. This is 1½ .

You can visually see that **one** ½ and **half** another ½ will fit into ¾. This is 1½.

You can check with actual math!

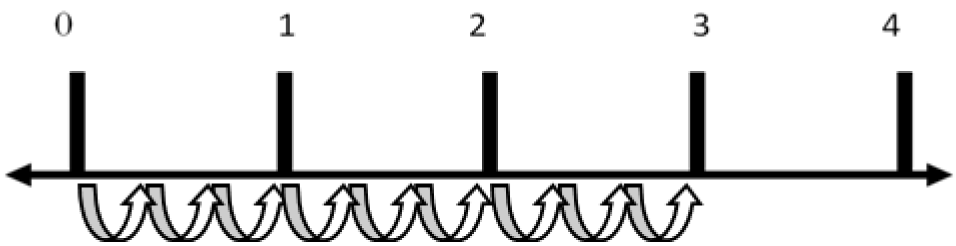
Same Change Flip

⇩ ⇩ ⇩

¾ ÷ ½ $\frac{3}{4}$ **x** $\frac{2}{1}$ **=** $\frac{6}{4}$ **which is 1 ½**

Another way to divide with graphics is on a number line.

3 $\div \frac{1}{3}$ is asking how many one thirds are there in three whole. The answer is 9.



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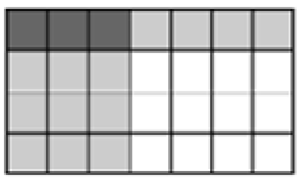
SOL 6.4 (Multiplying and Dividing Fraction Models)

1. Which expression is represented by this model?



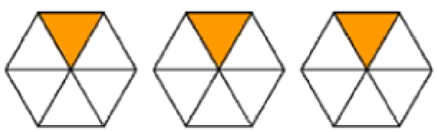
A $\frac{1}{7}\times\frac{1}{4}$

B $\frac{3}{7}\times\frac{1}{4}$

C $\frac{1}{7}\times\frac{3}{4}$

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

2. Each hexagon represents 1 whole.



Which product is represented by the shading shown on this model?

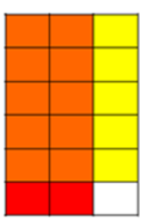
A 3×6

B $3\times\frac{1}{6}$

C $\frac{1}{3}\times\frac{1}{6}$

D $\frac{1}{3}\times6$

3. Which product is represented by the shading of the model?



a) $\frac{5}{9}\bullet\frac{2}{9}$

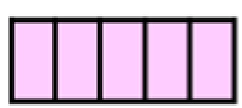
b) $\frac{2}{3}\bullet\frac{5}{6}$

c) $\frac{5}{18}\bullet\frac{2}{18}$

d) $\frac{2}{6}\bullet\frac{5}{6}$

4. This figure represents one whole divided into five equal parts.

How many $\frac{2}{5}$ are in 7?



SOL 6.6
The student will

a) **multiply and divide fractions and mixed numbers; (No calculator)**
b) **estimate solutions and then solve single-step and multistep practical problems involving addition, subtraction, multiplication, and division of fractions (Calculator)**

Simplifying fractions to their simplest form assists with uniformity of answers and concepts.

*Simplifying fractions: Find the greatest common factor (GCF) of the numerator and the denominator and then divide the numerator and the denominator by the GCF.

Example: Simplify $\frac{8}{20}$

The factors of 8 are 1, 2, 4, 8
The factors of 20 are 1, 2, 4, 5, 10, 20

The greatest common factor of 8 and 20 is 4, so divide the numerator and the denominator by 4.

$\frac{8}{20} \div \frac{4}{4} = \frac{2}{5}$ so... $\frac{8}{20} = \frac{2}{5}$

Rewriting an improper fraction as a mixed number assists with uniformity of answers and concepts.

Example 1: $\frac{17}{5}$ is an improper fraction that needs to be rewritten as a mixed number.

Divide the numerator by the denominator. $17 \div 5 = 3\frac{2}{5}$

5 goes into 17 three times. 3 becomes the whole number. There is a remainder of 2. The 2 becomes the new numerator and the 5 stays as the denominator.

Example 2: $\frac{14}{3}$ is an improper fraction that needs to be rewritten as a mixed number. Divide the numerator by the denominator. $14 \div 3 = 4\frac{2}{3}$

3 goes into 14 four times. 4 becomes the whole number. There is a remainder of 2. The 2 becomes the new numerator and the 3 stays as the denominator.

There is implied addition of the whole number part and the fractional part in mixed numbers.

Equivalent forms are needed to perform the operations of addition and subtraction with fractions.

Adding fractions with unlike denominators:

Step 1: Find the least common denominator by identifying the multiples of each denominator.

Example: $\frac{2}{3}$ The multiples of 3 are 3, 6, 9, **12**, 15, 18, etc.

$+\ \frac{3}{4}$ The multiples of 4 are 4, 8, **12**, 16, 20, 24, etc.

The least common multiple of 3 and 4 is 12. This is also called the least common denominator (LCD).

Step 2: Rename the fractions using the LCD and then add the numerators.

Example: $\frac{2^{\times 4}}{3_{\times 4}} = \frac{8}{12}$ Now add. 8 + 9 = 17

*Remember, whatever you do to the numerator, you must also do the same to the denominator!

$+\ \frac{3^{\times 3}}{4_{\times 3}} = \frac{9}{12}$ The denominator stays the same after you add or subtract.

Step 3: $\frac{17}{12}$ Now simplify. The correct answer is $1\frac{5}{12}$.

Multiplication and division are inverse operations.

Inverse operations are operations which undo each other.

Example 1: $6 \times 4 = 24$ therefore $24 \div 6 = 4$
(multiplication and division are inverse operations)

Example 2: $10 + 5 = 15$ therefore $15 - 10 = 5$
(addition and subtraction are inverse operations)

- It is helpful to simplify before multiplying fractions, using the commutative property of multiplication to change fractions to simplest form before multiplying.

Example: Look diagonally to identify a common factor.

The greatest common factor of 14 and 4 is 2 so divide by 2.

$$\frac{14}{18} \cdot \frac{3}{4}$$

The greatest common factor of 3 and 18 is 3 so divide by 3.

This is your answer already in simplest form!

$$\frac{14^{\div 2}}{18_{\div 3}} \cdot \frac{3^{\div 3}}{4_{\div 2}} = \frac{7}{6} \cdot \frac{1}{2} = \frac{7}{12}$$

*This ***only*** works when multiplying fractions. Fractions ***cannot*** be simplified before adding, subtracting, or dividing.

- To divide by a fraction, multiply by its reciprocal.

  Any two numbers whose product is 1 are called reciprocals. For example, $\frac{1}{2}$ and 2 are reciprocals because $\frac{1}{2} \cdot 2 = 1$. You use reciprocals when you divide by fractions.

  Example: $\frac{4}{5} \div \frac{1}{3}$

  $\frac{4}{5} \div \frac{1}{3} = \frac{4}{5} \times \frac{3}{1}$ *Multiply by the reciprocal of* $\frac{1}{3}$.

  $= \frac{12}{5}$ or $= 2\frac{2}{5}$ *Multiply the numerators and denominators and rewrite as a mixed number.*

Answers are located on the last page of the booklet.

SOL 6.6 (Multiplying and Dividing Fractions)

1. **Greg and Sam ordered a pizza for lunch. Greg ate $\frac{3}{4}$ of the pizza, and Sam ate $\frac{1}{8}$ of the pizza. How much of the whole pizza was eaten by Greg and Sam?**

   A $\frac{1}{3}$ C $\frac{5}{8}$

   B $\frac{1}{2}$ D $\frac{7}{8}$

2. **Carl needs $2\frac{2}{3}$ cups of flour to make a certain cake. He only has $\frac{3}{8}$ cup of flour in the pantry. How many more cups of flour does Carl need for the cake?**

   F $2\frac{1}{24}$ cups H $2\frac{7}{24}$ cups

   G $2\frac{1}{5}$ cups J $2\frac{5}{11}$ cups

3. **Tim mails two boxes of cookies to friends. One box weighs $1\frac{3}{4}$ pounds, and the other weighs $2\frac{2}{3}$ pounds. What is the total weight of the two boxes?**

   A $2\frac{1}{7}$ pounds C $3\frac{5}{7}$ pounds

   B $3\frac{5}{12}$ pounds D $4\frac{5}{12}$ pounds

4. **Risa drank $\frac{5}{8}$ glass of lemonade. Fola drank $\frac{1}{4}$ glass of lemonade. If the glasses held the same amount of lemonade, how much more did Risa drink than Fola?**

   F $\frac{1}{8}$ glass H $\frac{1}{2}$ glass

   G $\frac{3}{8}$ glass J $\frac{3}{4}$ glass

5. **A farmer has 6 cartons of specialty eggs for sale. Each carton contains 12 eggs. If $\frac{2}{3}$ of the eggs are brown, what is the total number of brown eggs he has for sale?**

   A 4

   B 8

   C 48

   D 72

6. **One batch of Derrick's pancake recipe takes $2\frac{3}{4}$ cups of milk. If Derrick makes 3 batches of his pancake recipe, how many cups of milk will he need?**

A $8\frac{3}{4}$ cups C $6\frac{3}{4}$ cups

B $8\frac{1}{4}$ cups D $6\frac{1}{4}$ cups

7. **Jamal walked $\frac{3}{4}$ mile yesterday morning and $\frac{1}{8}$ mile yesterday afternoon. What was the total distance walked by Jamal?**

A 1 mile C $\frac{1}{2}$ mile

B $\frac{7}{8}$ mile D $\frac{1}{3}$ mile

8. **Maria has a piece of ribbon $\frac{5}{6}$ foot long. She cuts $\frac{3}{4}$ foot off of the piece of ribbon. What is the length of the remaining piece of ribbon?**

A $\frac{1}{12}$ foot C $\frac{1}{6}$ foot

B $\frac{1}{8}$ foot D $\frac{1}{4}$ foot

9. **Harry worked $1\frac{3}{4}$ hours on Friday and $3\frac{1}{2}$ hours on Saturday. What was the total amount of time Harry worked on those days?**

F $4\frac{1}{4}$ hours H $5\frac{1}{4}$ hours

G $4\frac{5}{8}$ hours J $5\frac{1}{2}$ hours

10. Donna and Darcy collected newspapers for recycling. Donna collected $5\frac{3}{4}$ pounds of newspaper. Darcy collected $2\frac{1}{4}$ pounds of newspaper. What was the total amount of newspaper they collected?

F $8\frac{1}{2}$ pounds **H** $7\frac{1}{2}$ pounds

G 8 pounds **J** 7 pounds

11. Which fraction is equivalent to $\frac{5}{6} \div \frac{1}{3}$?

A $\frac{5}{18}$ **C** $1\frac{1}{6}$

B $\frac{2}{5}$ **D** $2\frac{1}{2}$

12. What is the product of $2\frac{2}{3}$ and $1\frac{1}{6}$?

○ **A** $2\frac{1}{9}$ ○ **C** $3\frac{1}{9}$

○ **B** $2\frac{2}{7}$ ○ **D** $3\frac{5}{6}$

13. Nigel has 3 rolls of ribbon. Each roll has $8\frac{3}{4}$ feet of ribbon. It takes $1\frac{3}{4}$ feet of ribbon to make one bow. What is the total number of bows that Nigel can make using these 3 rolls of ribbon?

○ **A** 5 bows ○ **C** 31 bows

○ **B** 15 bows ○ **D** 46 bows

SOL 6.16
The student will compare and contrast dependent and independent events and determining probabilities for dependent and independent events.

The probability of an event occurring is equal to the ratio of desired outcomes to the total number of possible outcomes (sample space).

The probability of an event occurring can be represented as a ratio or the equivalent fraction, decimal, or percent.

The probability of an event occurring is a ratio between 0 and 1.
- A probability of 0 means the event will never occur.
- A probability of 1 means the event will always occur.

- A **simple event** is one event (e.g., pulling one sock out of a drawer and examining the probability of getting one color).

- **Independent events**- when one event is not affected by a second event.

The probability of an independent event is found by using the following formula:

P(A and B) = P(A) · P(B)

For example, if you roll two number cubes, the number that you roll on the second cube is not affected by the number you rolled on the first cube. The probability of two independent events can be found by multiplying the probability of the first event by the probability of the second event.

Example 1: Independent Events
A number cube is rolled twice. Find the probability of rolling a five on both of the rolls**.**

$P(5) = \frac{1}{6}$

$P(5 \text{ on 1st roll and 5 on 2nd roll}) = \frac{1}{6} \cdot \frac{1}{6} \text{ or } \frac{1}{36}$

So, the probability of rolling a 5 on both rolls is $\frac{1}{36}$.

- **Dependent events**- the result of one event affects the result of a second event. The probability of two dependent events is found by using the following formula:

  P(A and B) = P(A) · P(B after A)

Example 2: Dependent Events

A box contains 4 cupcakes with vanilla frosting, 5 cupcakes with chocolate frosting, and 3 cupcakes with strawberry frosting. Sally reaches in the box and randomly takes two cupcakes, one after the other. Find the probability that she will choose a strawberry-frosted cupcake and then a chocolate-frosted cupcake.

$P\text{(strawberry)} = \frac{3}{12}$	12 cupcakes, 3 are strawberry
$P\text{(chocolate)} = \frac{5}{11}$	11 cupcakes after 1 strawberry has been removed, 5 are chocolate.

$$P\text{(strawberry, then chocolate)} = \frac{\cancel{3}^{1}}{\cancel{12}_{4}} \cdot \frac{5}{11} = \frac{5}{44}$$

So, the probability that Sally will choose a strawberry frosted cupcake and then a chocolate frosted cupcake is $\frac{5}{44}$, or about 11%.

SOL Practice Items provided by the VDOE,
http://www.doe.virginia.gov/testing/sol/standards_docs/mathematics/index.shtml
Answers are located on the last page of the booklet.

SOL 6.16 (Probability of dependent and independent events)

1. **A jar contains these pens that are all the same size and shape.**

- **4 red pens**
- **3 green pens**
- **5 blue pens**
- **4 black pens**

One pen is randomly selected from the jar. After replacing the first pen, a second pen is randomly selected. Randomly selecting the second pen is —

A a dependent event because the outcome of the second pen depends on the outcome of the first pen

B a dependent event because the outcome of the second pen does not depend on the outcome of the first pen

C an independent event because the outcome of the second pen depends on the outcome of the first pen

D an independent event because the outcome of the second pen does not depend on the outcome of the first pen

2. **A spinner has four equal sections labeled W, X, Y, and Z. A fair coin has faces labeled heads and tails. Edward will spin the arrow of the spinner and flip the coin one time each. What is the probability the arrow will land on the section labeled Z and the coin will land with heads face-up?**

A $\frac{1}{8}$

B $\frac{1}{4}$

C $\frac{1}{3}$

D $\frac{1}{2}$

3. **Greta has 2 bags of tiles that are all the same size and shape.**

- **Bag A has 1 blue tile and 3 green tiles.**
- **Bag B has 2 yellow tiles and 4 black tiles.**

Which of these best describes dependent events?

○ **A** Randomly selecting one tile from Bag A, replacing the tile, then randomly selecting another tile from Bag A

○ **B** Randomly selecting one tile from Bag B, not replacing the tile, then randomly selecting another tile from Bag B

○ **C** Randomly selecting one tile from Bag A, replacing the tile, then randomly selecting one tile from Bag B

○ **D** Randomly selecting one tile from Bag B, not replacing the tile, then randomly selecting one tile from Bag A

4. **This chart shows the three pairs of pants and four shirts that Bobby packed for a trip. Bobby will randomly select an outfit to wear. He can choose one pair of pants and one shirt. Using the chart, determine the probability that he will select a pair of blue jeans and the yellow shirt.**

Pants	Shirt Color
Blue Jeans	Orange
Blue Jeans	Yellow
Khakis	Green
	Red

5. **Alexis has a deck of cards labeled as follows:**

- **3 cards with a heart**
- **2 cards with a circle**
- **1 card with a flower**
- **1 card with a ball**

a) What is the probability that she will randomly select a card with a heart, replace it, and then select a card with a ball?

b) What is the probability that she will randomly select a card with a circle, NOT replace it, and then select a card with a circle?

Testing Information

1st Benchmark Test **October 19th – 23rd**

SOL's Tested: 6.1, 6.2, 6.4, 6.6

2nd Benchmark Test **December 14th – 18th**

SOL's Tested: 6.16, 6.7, 6.5, 6.17, 6.19, 6.8

- with a cumulative review of all previous SOLs taught

3rd Benchmark Test **March 14th – 18th**

SOL's Tested: 6.18, 6.10, 6.3, 6.20, 6.11, 6.12, 6.13

- with a cumulative review of all previous SOLs taught

Teacher Made Assessments: 6.15, 6.14, 6.9

Math Smarts!

Math + Smart Phone = Math Smarts!

Need help with your homework? Wish that your teacher could explain the math concept to you one more time? This resource is for you! Use your smart phone and scan the QR code and instantly watch a 3 to 5 minute video clip to get that extra help. (These videos can also be viewed without the use of a smart phone. Click on the links included in this document.)

<u>Directions:</u> Using your Android-based phone/tablet or iPhone/iPad, download any QR barcode scanner. How do I do that?

1. Open Google Play (for Android devices) or iTunes (for Apple devices).
2. Search for "QR Scanner."
3. Download the app.

After downloading, use the app to scan the QR code associated with the topic you need help with. You will be directed to a short video related to that specific topic!

It's mobile math help when <u>you</u> need it! So next time you hear, "You're always on that phone" or "Put that phone away!" you can say "It's homework!!!"

Access this document electronically on the STAR website through Suffolk Public Schools.
(http://star.spsk12.net/math/MSInstructionalVideosQRCodes.pdf)

PLEASE READ THE FOLLOWING:

This resource is provided as a refresher for lessons learned in class. Each link will connect to a YouTube or TeacherTube video related to the specific skill noted under "Concept." Please be aware that advertisements may exist at the beginning of each video.

SOL	Link	QR Code
6.19	Identifying properties of real numbers http://www.youtube.com/watch?v=mgQ8uFuZD08	
6.1	Describing relationships as ratios https://www.youtube.com/watch?v=yztq_ELjfSw	
6.2	Representing percents http://www.youtube.com/watch?v=Lvr2YsxG10o	
6.2	Comparing and ordering fractions, decimals, and percents http://www.youtube.com/watch?v=PZDg0_djUtE	
6.2	Representing percents as decimals and fractions http://www.youtube.com/watch?feature=player_detailpage&v=-gB1y-PMWfs	

6.2	Representing fractions as decimals and percents http://www.youtube.com/watch?v=Hkwfibux88s	
6.2	Demonstrating equivalent relationships with fractions, decimals and percents http://tinyurl.com/qjcz27c	
6.4	Representing multiplication and division of fractions http://learnzillion.com/lessons/213-multiply-fractions-by-fractions-using-area-models	
6.4	Representing multiplication and division of fractions http://learnzillion.com/lessons/204-divide-fractions-by-fractions-using-models	
6.6	Subtracting Mixed Numbers https://www.youtube.com/watch?v=zPOSnD02DQc	
6.6	Operations with Fractions (add, subtract, multiply, divide) *Cool Nontraditional Methods* https://www.youtube.com/watch?v=0o32bnoLZaM	

Vocabulary Words
SOL 6.1

ratio	**A comparison of two quantities; A ratio is used to represent relationships within and between sets.**

SOL 6.2

less than	**The symbol “<” is used to describe a numerical term smaller than the one compared to it.**
greater than	**The symbol “>” is used to describe a numerical term larger than the one compared to it.**
equal to	**The symbol “=” is used to show that two numerical terms are equal.**
percent	**Percent means “per 100” or how many “out of 100”; percent is another name for hundredths.**
equivalent	**Expressions that have the same value or that have the same mathematical meaning; For example, ½, 50% and 0.5 are equivalent**
fraction	**A number representing some part of a whole or part of a set; one number compared to another in the form a/b**
decimal number	**Any number written in decimal notation, in which a fractional part is separated from the integer part with a decimal point**

SOL 6.4/6.6

addition	**The act or process of combining numerical values, so as to find their sum**
sum	**An amount obtained as a result of adding numbers**

subtraction	The arithmetic operation of finding the difference between two quantities or numbers
difference	An amount obtained as a result of subtracting numbers
reciprocal	Any two numbers whose product is 1. Example: ½ and 2 are reciprocals because ½ x 2 = 1
product	An amount obtained as a result of multiplying numbers
division	The operation of determining how many times one quantity is contained in another; the inverse of multiplication
quotient	An amount obtained as a result of dividing numbers
numerator	The expression written above the line in a fraction
denominator	The expression written below the line in a fraction that indicates the number of parts into which one whole is divided
improper fraction	A fraction in which the numerator is larger than or equal to the denominator; The value of an improper fraction is greater than or equal to one.
mixed number	A numerical value that combines a whole number and a fraction
simplest form	A fraction is in simplest form when the greatest common factor of the numerator and denominator is 1.
simplify	To reduce the numerator and the denominator in a fraction to the smallest form possible; To divide the numerator and denominator by the GCF is simplifying a fraction

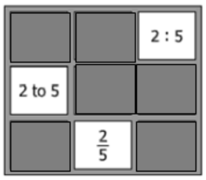
LCD	**The least common multiple of the denominators of two or more fractions; Example: 6 is the least common denominator of 2/3 and 1/6**
estimate	**To make an approximate or rough calculation, often based on rounding**

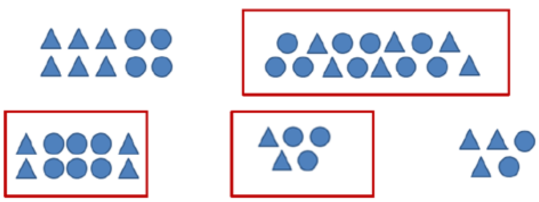
SOL 6.16

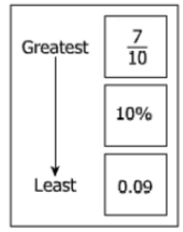
sample space	**The set of all possible outcomes in a probability experiment**
probability	**The chance of an event occurring expressed using a *ratio*; The numerator describes how many times the event will occur, while the denominator describes the total number of outcomes for the event.**
outcome	**Possible results of a probability event; Example: 4 is an outcome when a number cube is rolled.**
ratio	**A comparison of two numbers by division; Example: The ratio 2 to 3 can be expressed as 2 out of 3, 2:3, or 2/3.**
event	**A specific outcome or type of outcome**
possible outcome	**All the possible events in a probability experiment**
dependent events	**The result of one event affects the result of a second event**
independent events	**When one event is not affected by a second event**

Released Test Answers (1st Nine Weeks)

SOL 6.1 (Ratios)

1. A
2. A
3. D
4. C
5. A
6. 

7. 6:5, 6 to 5, $\frac{6}{5}$
8. 

10. 

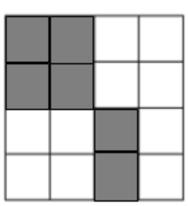
11. 

12. a.) A
13. $\frac{3}{1000}$
14. B
15.

$\boxed{0.015}$	0.31	$\boxed{0.023}$	0.002
0.004	0.50	$\boxed{0.049}$	0.205

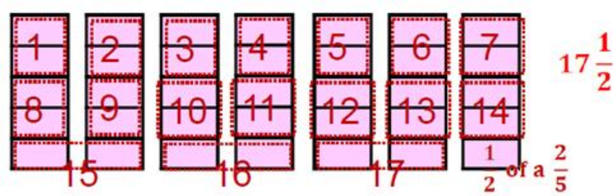
SOL 6.2 (Comparing & Ordering Fractions, Decimals, and Percents)

1. G
2. G
3. H
4. B
5. D
6. A
7. G
8. B
9. You should have shaded any combination of exactly six boxes.



SOL 6.4 (Multiplication and Division of Fractions Models)

1. B
2. B
3. B
4. 17 ½



SOL 6.6 (Multiplication and Division of Fractions)

1. D
2. H
3. D
4. G
5. A
6. C
7. B
8. B
9. A
10. H
11. G
12. D
13. A
14. B

SOL 6.16 (Sample Space and Probability)

1. F
2. B
3. C
4. G
5. D
6. B
7. J
8. D
9. A
10. B
11. $\frac{1}{6}$ or approximately 16.7%
12. a.) $\frac{3}{49}$ or approximately 6.1%

    b.) $\frac{1}{21}$ or approximately 4.8%