Crossroads Math -- Summer Curriculum

Rising 7th Graders -- Yale Cohort

Below you will find a schedule of what should be studied, practiced, AND MASTERED each week over the summer. Weeks 1-3 focus on ensuring foundational standards are mastered, while weeks 4-8 focus on the first standards of the 7th grade curriculum that will be assessed during the first weeks of the school year.

- "Daily Memorization" - Creating flash cards (can be made by cutting up blank paper) is recommended to help in memorizing. Reviewing these for 10 minutes each day is highly encouraged.
- KhanAcademy.org is an excellent resource with "how to" videos and multiple practice types per skill.
- To keep organized, use this front & back cover page as a checklist of what you have mastered.
- This packet is merely a guide. Students are responsible for fully understanding each standard listed. For some this packet will be enough instruction and practice, but for others they will need to supplement instruction with videos online and find additional practice online as well.

Prerequisite Level Skills List

⇨⇨⇨ QUIZ ON 2nd DAY OF SCHOOL: *Wednesday, September 4th, 2019* ⇦⇦⇦

Week	Daily MEMORIZATION	Standards to Learn & Practice	Mastery?
week 1 Pages 3-8	6.RP.3 Equivalent Fraction, Decimal, Percent values: Tenths & Fifths $\frac{1}{10}$ $\frac{2}{10}$ $\frac{3}{10}$ $\frac{4}{10}$ $\frac{5}{10}$ $\frac{6}{10}$ $\frac{7}{10}$ $\frac{8}{10}$ $\frac{9}{10}$ $\frac{10}{10}$ 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% $\frac{1}{5}$ $\frac{2}{5}$ $\frac{3}{5}$ $\frac{4}{5}$ $\frac{5}{5}$ 0.2 0.4 0.6 0.8 1.0 20% 40% 60% 80% 100%	Number System: Decimals ☐ 6.NS.3 - Decimal Operations ❏ Add ❏ Subtract ❏ Multiply ❏ Divide	
week 2 Pages 9-13	6.RP.3 Equivalent Fraction, Decimal, Percent values: Eighths, Fourths, Halves $\frac{1}{8}$ $\frac{3}{8}$ $\frac{5}{8}$ $\frac{7}{8}$ 0.125 0.375 0.625 0.875 12.5% 36.7% 62.5% 87.5% $\frac{1}{2}$ $\frac{2}{2}$ and $\frac{1}{4}$ $\frac{2}{4}$ $\frac{3}{4}$ $\frac{4}{4}$ 0.5 1.0 0.25 0.5 0.75 1.0 50% 100% 25% 50% 75% 100%	Number System: Fractions ☐ 5.NF.1 - Adding and Subtracting Fractions and Mixed Numbers with UNlike Denominators ❏ 4.NFB.3c - Adding and Subtracting Fractions and Mixed Numbers with LIKE Denominators	
week 3 Pages 14-19	6.RP.3 Equivalent Fraction, Decimal, Percent values: Thirds & Converting between any fraction, decimal, percent $\frac{1}{3} = 0.\overline{3} = 33.\overline{3}\,\%$ $\frac{2}{3} = 0.\overline{6} = 66.\overline{6}\%$	Number System / Expressions & Equations ☐ 6.EE.1 - Order of Operations & Exponents ❏ With whole numbers ❏ With Decimals & Fractions	

YOU WILL HAVE A QUIZ ON THESE STANDARDS ON THE 2nd DAY OF SCHOOL!
This quiz will not count toward your quarter one math grade; however, all of these skills foundationally support the seventh grade curriculum and mastery of 7th grade material will be incredibly challenging without this foundation.

7th Grade Math Standards List

⇨⇨⇨ MASTERY QUIZ 2nd week *Friday, September 13th, 2019* on 7.NS.1-3 ⇦⇦⇦
⇨⇨⇨ MASTERY QUIZ 3rd week *Friday, September 20th, 2019* on 7.SP.3 & 7.SP.4 ⇦⇦⇦
⇨⇨⇨ MASTERY QUIZ 4th week *Friday, September 27th, 2019* on 7.EE.1 & 7.EE.4 ⇦⇦⇦

Week	Daily MEMORIZATION	Standards to Learn & Practice	Mastery?
week 4 Pages 18-24	7.NS.2 - Integer Multiplication/Division Make two sets of cards #1-12, one set of positives and one set of negatives. Shuffle them together and choose two to create a multiplication fact to practice.	Statistics ☐ 7.SP.3 - Assess the degree of overlap of two data sets, measure differences between the measures of centers as a multiple of a measure of variability	
week 5 Pages 25-29	7.NS.1 - Integer Addition/Subtraction Make two sets of cards #1-12, one set of positives and one set of negatives. Shuffle them together and choose two to create an addition or subtraction fact to practice.	Statistics ☐ 7.SP.4 - Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations	
week 6 Pages 30-35	7.NS.1 - Integer Addition/Subtraction Continue Addition/Subtraction Facts with negatives from week 5	Expressions & Equations ☐ 7.EE.1 - Apply properties of operations to add, subtract, factor, and expand linear expressions with rational coefficients. ❏ Combining Like Terms ❏ Distributive property ❏ Additive Inverse property	
week 7 Pages 36-41	7.NS.1 - Rational Numbers Addition/Subtraction Now add in some practice with Adding and Subtracting with negatives that include fractions and decimals. You can use KhanAcademy or Google a worksheet to practice.	Expressions & Equations ☐ 7.EE.4 - Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.	
week 8 Pages 42-47	7.NS.1 - Rational Numbers Multiplication & Division Now add in some practice with Adding and Subtracting with negatives that include fractions and decimals. You can use KhanAcademy or Google a worksheet to practice.	Number System ☐ 7.NS.1 - Add & Subtract Rational Numbers and Additive Inverse Property ☐ 7.NS.2 - Multiply & Divide Rational Numbers ☐ 7.NS.3 - Rational Numbers Operations in Context	

YOU WILL HAVE A MASTERY QUIZ ON THESE STANDARDS!!
Each standard will count as an individual mastery quiz grade for quarter one.
We will be quickly reviewing and practicing these skills during the first three weeks of school.

Pages 48-50 are ANSWER KEYS to Practice (For student to use regularly to gauge progress.)
Pages 51-52 are the ANSWER KEYS to QUIZZES (For Family Member hold onto to check)

WEEK 1

Daily Memorization

6.RP.3 - Equivalent Percents, Decimals, Fractions

Tenths & Fifths

-You will need to have these benchmark fractions, decimals, percents memorized this week.

-The best way to memorize these is to create flashcards and practice them for 10 minutes each day.

-You can also have someone quiz you with them to make sure you have mastered them!

MEMORIZE the equivalent decimal & percent for each fraction below:

Tenths (10th's)

Fraction	Decimal	Percent
1/10	0.1	10%
2/10 =1/5	0.2	20%
3/10	0.3	30%
4/10 = 2/5	0.4	40%
5/10	0.5	50%
6/10 = 3/5	0.6	60%
7/10	0.7	70%
8/10 = 4/5	0.8	80%
9/10	0.9	90%
10/10 =1	1	100%

Fifths (5th's)

Fraction	Decimal	Percent
1/5	0.2	20%
2/5	0.4	40%
3/5	0.6	60%
4/5	0.8	80%
5/5 =1	1	100%

WEEK 1

6.NS.3 - Decimal Operations

Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

KhanAcademy: https://www.khanacademy.org/commoncore/grade-6-NS#6.NS.B.3

Reminder: You must demonstrate full conceptual understanding of the standard in addition to procedural mastery of the skill.

NOTES:

6.NS.3 Decimal Addition and Subtraction

LINE UP THE DECIMALS!! in order to align the place values of digits
Hint: Treat decimals like money. $5 = $5.00

6.NS.3 Decimal Multiplication ×

1. Remove the decimals from each factor
2. Count the total decimal place values removed
3. Multiply like normal
4. Place the decimal back into the product using the total number of decimal place values removed

6.NS.3 Decimal Division ÷

When there is a decimal in the divisor, you must make some changes to align your decimal before dividing.

1. Move the decimal in the divisor to make it a whole number
2. Count the number of decimal place value jumps and move the decimal in the dividend the same number of times as the divisor
3. Move the decimal up into the quotient
4. Divide like using long division algorithm

WEEK 1

6.NS.3 - Decimal Operations

SKILL PRACTICE

Adding

1) 2.4 + 3.3 =

2) 12.7 + 2.8 =

3) 6.72 + 5 =

4) 245.987 + 16.204 =

5) 34.69 + 72.507 =

Subtracting

1) 7.4 - 3.3 =

2) 15.7 - 2.8 =

3) 6.79 - 5 =

4) 45.53 - 16.69 =

5) 94.609 - 72.517 =

WEEK 1

6.NS.3 - Decimal Operations

SKILL PRACTICE

Multiplying

1) 2.4 x 0.3=

2) 12.7 x 0.05 =

3) 6.72 x 10 =

4) 0.024 x 0.62 =

5) 4.8 x 5.9 =

Dividing

1) 0.24 ÷ 0.3=

2) 0.125 ÷ 0.5 =

3) 68.5 ÷ 10 =

4) 12.4 ÷ 1.2 =

5) 4.8 ÷ 0.04 =

WEEK 1

6.NS.3 - Decimal Operations

STANDARD PRACTICE

1) Suppose you buy 5 pounds of apples for $1.29 per pound. How much money would you spend on the apples?

2) In order to train for a 5k, you have decided to do a practice run of 3.1 miles and have already run 1.56 miles. How many more miles do you need to run?

3) Mrs. Jones wants to hike two trails. The length of one trail is 6.706km. The length of the other trail is 9.0704km. What is the total length of the two trails?

4) Whole Foods had pineapples on sale for $1.20 per pound. Tony spent $5.28 on pineapples. How many pounds of pineapples did he buy?

5) A hat costs $10.95 and a T-shirt costs $14.20. How much change will you receive if you pay for both items with a $50 bill?

6) A shelf used to store DVDs is 60.96cm wide. If each DVD is 1.5cm wide, what is the maximum number of DVDs that can be stored on the shelf?

7) A toy boat costs $3.88 and a ball costs $1.29. If Jabre buys 2 toy boats and 3 balls, how much total money will she spend?

8) Tom had $84.50 and then spent $12.25 for a music CD, $17.85 for a gift, and $15.45 for gasoline. How much did he have left?

WEEK 1

6.NS.3 - Decimal Operations

PRACTICE QUIZ

The table shows the average price of gold (in dollars per ounce) for several years.

Year	1970	1980	1990	2000	2010
Average price (dollars per ounce)	36.02	615.00	383.51	279.11	1224.53

1. Find the quotient of the averages prices of gold in 2010 and 1970. What does the quotient mean?

2. A miner found three pieces of gold in an underground mine in 1970.
The pieces weighed 0.080 ounce, 0.122 ounce, and 0.096 ounce.

2a. Find the total weight of the gold that was found in the underground mine in 1970.

2 b. Find the total value (in dollars) of the gold when it was mined.

2 c. About how much more was the gold worth in 2010 than in 1970?

WEEK 2

Daily Memorization

6.RP.3 - Equivalent Percents, Decimals, Fractions

Eighths & Fourths & Halves

-You will need to have these benchmark fractions, decimal, percents memorized this week.

-The best way to memorize these is to create flashcards and practice them for 10 minutes each day.

-You can also have someone quiz you with them to make sure you have mastered them!

MEMORIZE the equivalent decimal & percent for each fraction below:

Eighth's (8th's)

Fraction	Decimal	Percent
1/8	0.125	12.5%
2/8 = 1/4	0.25	25%
3/8	0.375	37.5%
4/8 = 1/2	0.5	50%
5/8	0.625	62.5%
6/8 = 3/4	0.75	75%
7/8	0.875	87.5%
8/8 = 1	1	100%

Fourth's (4th's)

Fraction	Decimal	Percent
1/4	0.25	25%
2/4 = 1/2	0.5	50%
3/4	0.75	75%
4/4 = 1	1	100%

Halves (½'s)

Fraction	Decimal	Percent
1/2	0.5	50%
2/2 = 1	1	100%

WEEK 2

5.NF.1 - Add & Subtract Fractions with UNlike Denominators

Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)*

KhanAcademy: https://www.khanacademy.org/commoncore/grade-5-NF#5.NF.A.1

Reminder: You must demonstrate full conceptual understanding of the standard in addition to procedural mastery of the skill.

NOTES: ***FIRST, change any mixed numbers to improper fractions***

General technique:

1.Find Least Common Denomination (or LCM)
2.Make equivalent fractions using new deno
3.Add the numerators, denominators stay the same

$\frac{1}{6} + \frac{2}{9}$

$3 \cdot \frac{1}{6} + \frac{2}{9} \cdot 2$
$3 \cdot 6 \quad\quad 9 \cdot 2$

Rewrite with a common denominator.
Multiples of 6: 6, 12, 18, 24 . . .
Multiplies of 9: 9, 18 . . .

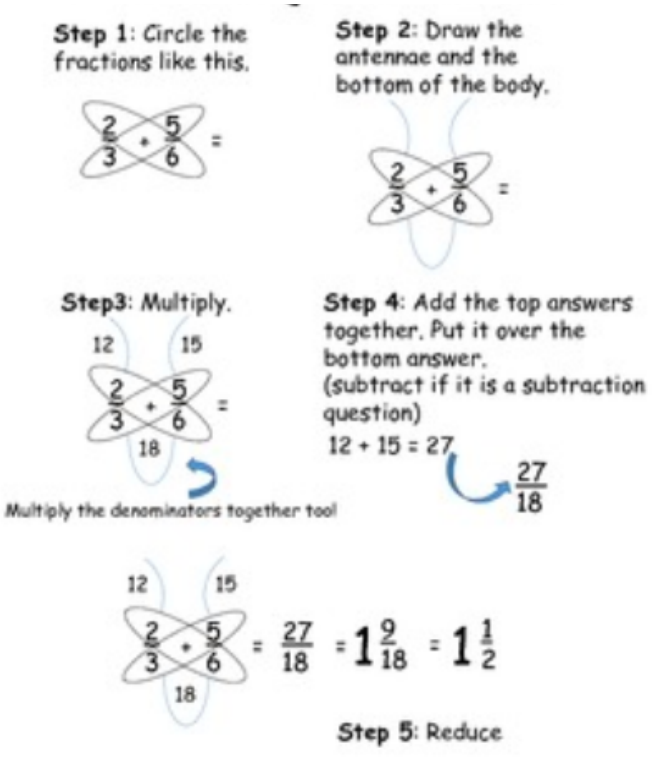
$\frac{3}{18} + \frac{4}{18}$

Add the fractions (add the numerators, the denominator stays the same).

$\frac{7}{18}$

"Trick" technique:

Google: "Butterfly fraction" addition



WEEK 2

5.NF.1 - Add & Subtract Fractions with Unlike Denominators

SKILL PRACTICE

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

2. $\frac{23}{2} + \frac{9}{4}$

3. $\frac{8}{3} - \frac{3}{2}$

4. $\frac{5}{2} - \frac{13}{12}$

5. $3\frac{1}{3} - 1\frac{7}{8}$

6. $5\frac{3}{4} + 1\frac{7}{8}$

7. $2\frac{1}{2} - 1\frac{4}{7}$

8. $1\frac{10}{11} + 1\frac{6}{11}$

WEEK 2

5.NF.1 - Add & Subtract Fractions with UNlike Denominators

STANDARD PRACTICE

1) Dina added five-sixths of a bag of soil to her garden. Her neighbor Natasha added eleven-eighths bags of soil to her garden. How much more soil did Natasha add than Dina?

2) It took Nick five-thirds of an hour to complete his math homework on Monday, three-fourths of an hour on Tuesday, and five-sixths of an hour on Wednesday. How many hours did he take to complete his homework altogether?

3) Dylan read his book about animals for 2 2/3 hours this week. His sister, Faith, read her football book for 1 1/5 hours this week. How much longer did Dylan read his book than Faith read hers?

4) There were $24\frac{1}{4}$ crates of tomatoes in the barn but $7\frac{3}{5}$ crates of tomatoes were rotten and had to be thrown out. Joe sold $8\frac{1}{3}$ crates and canned $7\frac{5}{6}$ crates of tomatoes. How many crates of tomatoes were left?

WEEK 2

5.NF.1 - Add & Subtract Fractions with UNlike Denominators

PRACTICE QUIZ

Hailey has 3 cats: Bonnie, Muffin and Baby.

1. Hailey feeds them Cat Cookies brand cat food.
Each day Bonnie eats $\frac{1}{2}$ of the box, Muffin eats $\frac{1}{8}$ of the box and Baby eats $\frac{1}{4}$ of the box. What fraction of a whole box do the cats eat, in all, each day?

2. Muffin and Baby spend much of each day sleeping.
Muffin sleeps for $\frac{3}{5}$ of the day and Baby sleeps for $\frac{7}{10}$ of the day.
Which of the two cats sleeps for longer? How much longer does it sleep each day?

3. Hailey's cats often share a carton of cat milk. Bonnie always drinks $\frac{1}{3}$ of the carton, Muffin always drinks $\frac{5}{12}$ of the carton, and Baby always drinks $\frac{1}{6}$ of the carton.
What fraction of the carton of cat milk is left over?

4. Hailey's cats love to jump in and out of their cat door. Yesterday the cat door was used 100 times by her cats. Bonnie used it for $\frac{1}{4}$ of the times and Muffin used it for $\frac{3}{10}$ of the times. How many times did Baby use the cat door? Explain how you figured it out.

WEEK 3

Daily Memorization

6.RP.3 - Equivalent Percents, Decimals, Fractions

Thirds & Converting between any fraction, decimal, percent

-You will need to have these benchmark fractions, decimal, percents memorized this week.

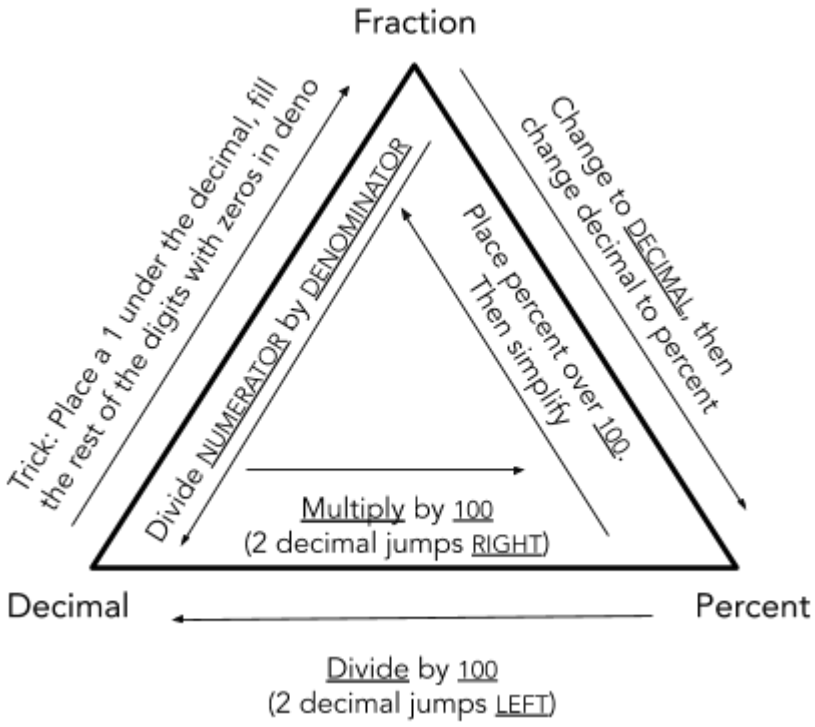
-The best way to memorize these is to create flashcards and practice them for 10 minutes each day.

-You can also have someone quiz you with them to make sure you have mastered them!

MEMORIZE the equivalent decimal & percent for each fraction below:

Thirds (3rd's)

Fraction	Decimal	Percent
1/3	0.3 repeating	33 ⅓ %
2/3	0.6 repeating	66 ⅔ %
3/3 = 1	1	100%



KhanAcademy.org has a ton of practice with "Percent, fraction, decimal conversions"

WEEK 3

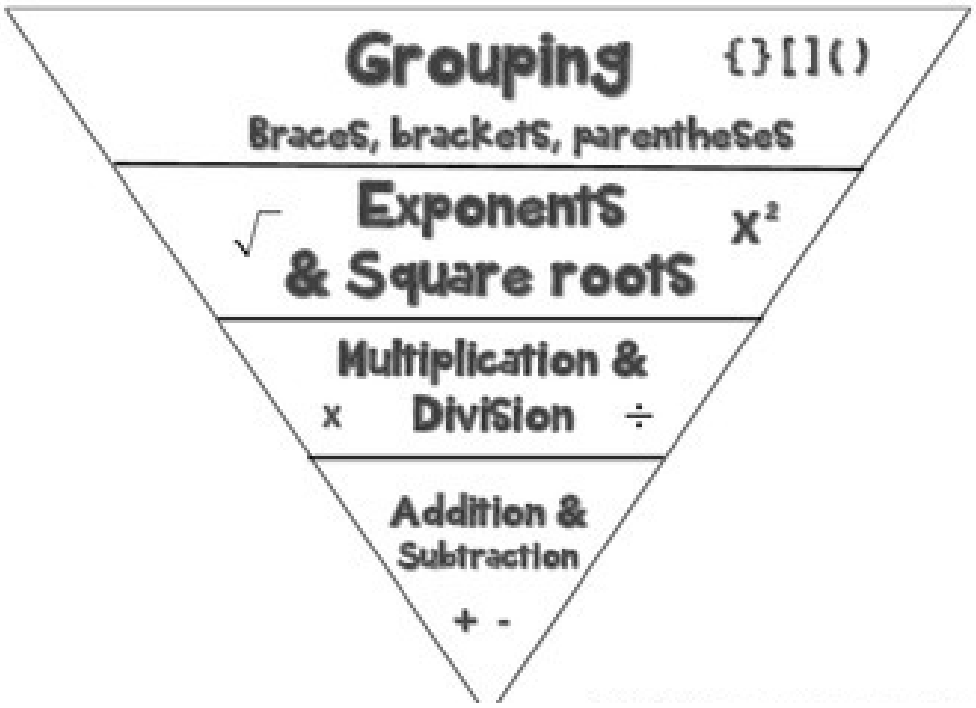
6.EE.1 - Order of Operations & Exponents

Write and evaluate numerical expressions involving whole-number exponents.

KhanAcademy: https://www.khanacademy.org/commoncore/grade-6-EE#6.EE.A.1

Reminder: You must demonstrate full conceptual understanding of the standard in addition to procedural mastery of the skill.

NOTES:



Powers	Words	Expression	Value
2^5	2 to the fifth power.	2 × 2 × 2 × 2 × 2	32
3^2	3 to the second power or 3 squared.	3 × 3	9
10^3	10 to the third power or 10 cubed.	10 × 10 × 10	1,000

WEEK 3

6.EE.1 - Order of Operations & Exponents

SKILL PRACTICE

Whole Numbers

1) $36 \times 3 + (56 \div 7) - 65$

2) $6 \times [(34 - 26) + 3]$

3) $26 \times 3 + [(56 \div 7) - 5]$

4) $[(14 + 7) + (66 \div 6)] \div 4$

Whole Numbers with Exponents

5) $8 \times (13 - 2) - 3^2$

6) $(9 - 2)^2 + (10 \div 2)$

7) $(8 - 4)^2 + (12 - 15 \div 5)$

8) $(6 \times 9 + 3^2) + 3$

WEEK 3

6.EE.1 - Order of Operations & Exponents

SKILL PRACTICE

Integers with Exponents

9) $6 - [10 \div 5]^3 \bullet 9$

10) $8 - [14 \div 7]^2 \bullet 11$

11) $[(-11) \bullet (-2)^2 - (-2)] + (-11)$

12) $[(-42) \div (-7)]^2 - (-2) \bullet 5$

Rational Numbers with Exponents

13) $(8.2 + -1.9))^2 \div (-2.7)$

14) $(-3.7) \times (-2.9) - (-9.4)^2$

15) $\left((\frac{1}{3})^2 - \frac{1}{6}\right) \div \frac{1}{3}$

16) $\left((-\frac{1}{5})^2 - \frac{2}{5} + \frac{1}{5}\right) \times (-\frac{7}{8})$

WEEK 3

6.EE.1 - Order of Operations & Exponents

PRACTICE QUIZ

1) $((-10)+2-(-7)) \times \left((-3)^2 \div 9\right)$

2) $6.7 - (-4.1) - (0.5)^2$

3) $\left(\left(-\frac{1}{3}\right)-\frac{5}{6}\right)^2 \div \left(-\frac{5}{9}\right)$

4) $(-1.5) \div \left(-1\frac{1}{3}\right)+(-1.5)^2$

PRACTICE QUIZ

Daily Memorization -- Weeks 1-3

6.RP.3 - Equivalent Percents, Decimals, Fractions

Fraction *SIMPLEST FORM ONLY*	Decimal	Percent
		30%
$\frac{1}{4}$		
$\frac{7}{10}$		
		60%
	0.8	
$\frac{2}{5}$		
		20%
$\frac{5}{8}$		
$\frac{3}{8}$		
$\frac{7}{8}$		
$\frac{1}{8}$		
$\frac{2}{3}$		
	0.75	75%
		5%
	1.05	

WEEK 4

Daily Memorization

7.NS.2 - Rational Operations Multiplication & Division

Multiply and Divide with negatives

KhanAcademy: https://www.khanacademy.org/commoncore/grade-7-NS#7.NS.A.2

7.NS.2 - Integer: Multiplication & Division

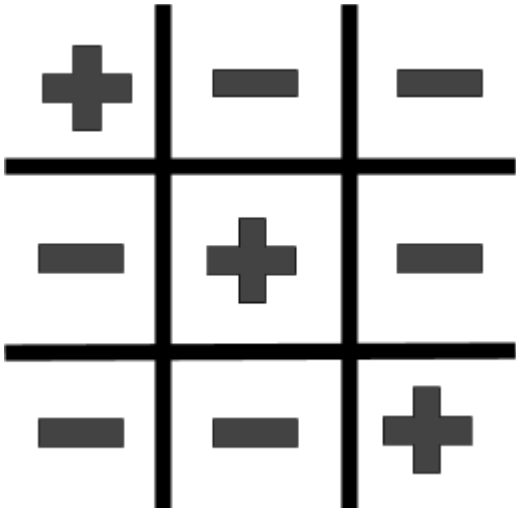
MULTIPLICATION & DIVISION ONLY

Interpretation:

\+ * - = -

\- * + = -

\- * - = +



Shortcut to remember drawing/rules:

1. Draw Tic-Tac-Toe board
2. Fill 3 in a diagonal row with +
3. Fill the rest with -

Multiplication examples:

- 2*(-4)=8
- -2*4=-8
- (-2)(-4)=8

Division examples:

- 8/(-4) = -2
- -8/2 = -4
- -8 / -2 = 4

Hint: If there is an odd number of negatives, it will be negative.

1. $6(-8)$
2. $-5(-9)$
3. $-63 \div (-9)$
4. $-36 \div 9$
5. $12(-6)$
6. $(-4)(-9)$
7. $(-5)(-3)(-1)(3)$
8. $36 \div (-3)$
9. $-48 \div (-6)$
10. $\frac{63}{-9}$
11. $\left(-\frac{3}{4}\right)^2$
12. $3(-9)$
13. $(-7)(-6)$
14. $(-1)(-2)(-3)(-4)$
15. $-42 \div 7$
16. $-56 \div -8$
17. $\frac{48}{-8}$
18. -5^2
19. -6^2
20. $(-4)^2$

KhanAcademy.org has a ton of practice with Operations with Negatives under 7.NS.2

WEEK 4

7.SP.3 - Measure the differences between the measures of center as a multiple of a measure of variability

Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.

For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.

KhanAcademy: https://www.khanacademy.org/commoncore/grade-7-SP#7.SP.B.3

Reminder: You must demonstrate full conceptual understanding of the standard in addition to procedural mastery of the skill.

NOTES:

Measures of Center

Mean - 1. Add up all the numbers 2. Divide by the number of addends

Median - 1. Order data least to greatest 2. Find the middle number

(3. If 2 middle numbers, find the mean of them)

Mode - Number that occurs the most (can have zero, one, or multiple modes)

6.SP.3 - Measures of Variability (IQR)

Range	Biggest # - smallest #
1. Find the greatest value 2. Find the least value 3. Subtract greatest - smallest	The difference between the lowest and highest values in the data set. *Be careful that you're *using actual values* -- sometimes confusing when looking at graphs/number lines*

Inner Quartile Range (IQR)	Q3 - Q1
1. ORDER THE DATA 2. Find the median (Q2) 3. Split your data set into two parts, a lower half and an upper half. 4. Find the median of the lower half (Q1) of the data 5. Find the median of the upper half (Q3) of the data 6. Subtract Q3 - Q1 (IQR)	A measure of variability based on dividing a data set into quartiles. Quartiles divide a rank-ordered data set into four equal parts using the median. ODD # of values in data set: *If there is one number in the middle, then do NOT include that number in lower/upper half when split. EVEN # of values in data set: *If two numbers in middle (and had to average them to find the median), include each of those numbers still in the lower/upper half when split. See notes on Box & Whisker Plot for definitions
ODD example: 5, 7, 5, 4, 6, 6, 7, 5, 6, 4, 5	
EVEN example: 5, 7, 5, 4, 6, 300, 6, 7, 5, 6, 4, 5	

6.SP.3 - Measures of Variability (MAD)

MAD - The average distance between each data value and the mean.

Mean	Absolute	Deviation
"average"	"absolute value"	"departing from standard"
On average,	*how far does each*	*value differ from the mean?*

Interpreting the MAD...

A LOW value for the MAD means...	A HIGH value for the MAD means...
• LOW variability in the data • Data is clustered together	• HIGH variability in the data • Data is spread out

How to calculate the MAD...

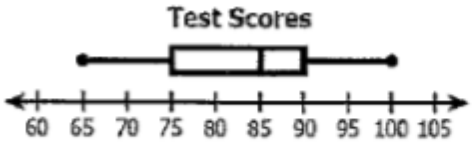
1. Find the MEAN -Add up all the numbers -Divide by the number of addends	Data set: 5, 7, 5, 4, 6, 6, 7, 5, 6, 4, 5
2. Find the ABSOLUTE VALUE of the DEVIATIONS of each number from the mean. Think: "How far is each number from the mean?"	Helpful to create a "new data set" of the deviations...
3. Find the MEAN OF THE DEVIATIONS -Find the mean of the "new data set" made of the deviations	

WEEK 4

7.SP.3 - Measure the differences between the measures of center as a multiple of a measure of variability

SKILL PRACTICE

Q12: This box and whisker plot displays information about the test scores for 25 students.



Based on the information in this box and whisker plot, which of the following statements is ***true***?

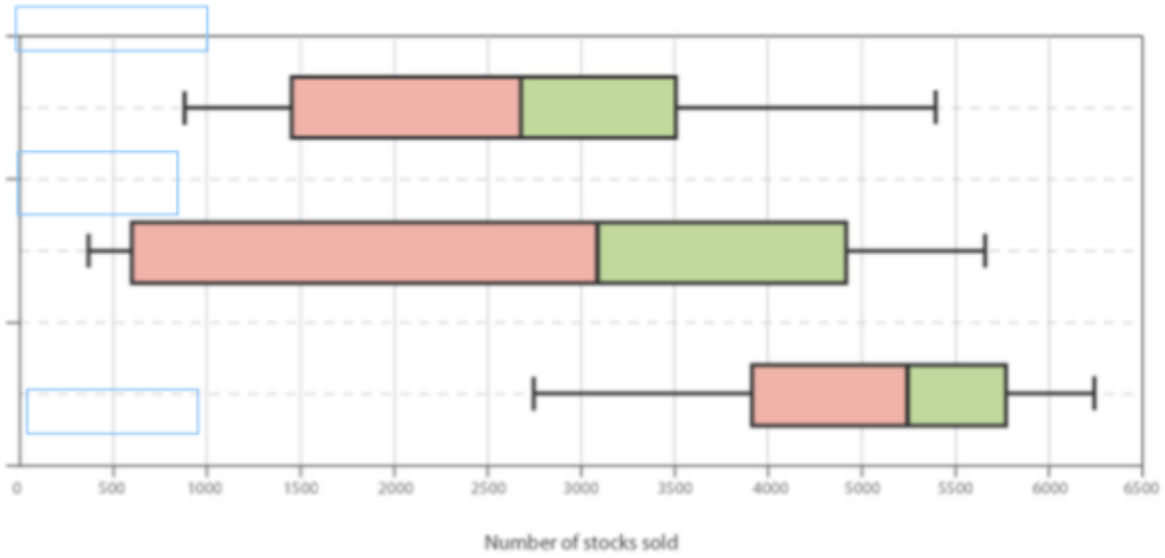
A The highest score on the test is 90

B The range of the test scores is 15

C The median test score is 85

D The mean test score is 85

Q4: Company A had the largest interquartile range. Company B had the highest minimum. Company C had the lowest median. Match each company to their box plot.

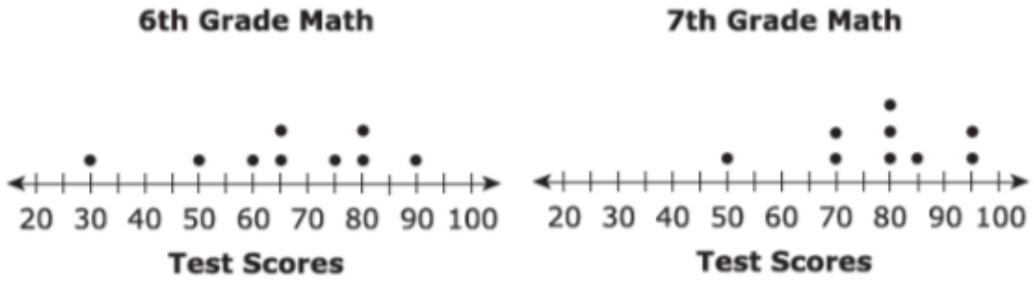


WEEK 4

7.SP.3 - Measure the differences between the measures of center as a multiple of a measure of variability

STANDARD PRACTICE

Q10: The dot plots show students' math test scores from the 6th and 7th grades.



Select the words that correctly complete the sentences.

The range of test scores in 6th grade is [a] the range of test scores in 7th grade.

The mean test score in 6th grade is [b] the mean test score in 7th grade.

a.
- less than
- greater than
- equal to

b.
- less than
- greater than
- equal to

Q2: A national dog show had two types of poodles. This table shows height data, in inches, for the two types of poodles.

Heights of Poodles

Type of Poodle	Number of Dogs	Mean Height (inches)	Variation in Height (inches)
Miniature Poodle	18	13	2
Standard Poodle	24	23	2

What number completes the sentence.

Enter your answer in the box.

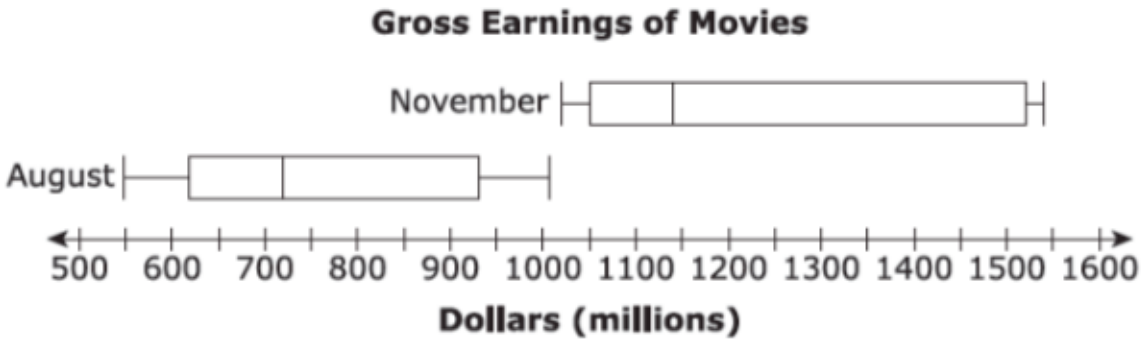
The difference, in inches, between the mean heights for the two types of poodles is [ ] times the variation for either type.

WEEK 4

7.SP.3 - Measure the differences between the measures of center as a multiple of a measure of variability

PRACTICE QUIZ

Q8: The box plots compare the gross earnings, in millions of dollars, of movies during the months of August and November.



Which statement correctly compares the two data sets?

A The median in August is about half of the median in November.

B The median in November is about 400 more than the median in August.

C The difference in the medians is about half of the range in November.

D The difference in the medians is about half of the interquartile range in August.

WEEK 5

Daily Memorization

7.NS.1 - Rational Operations Addition & Subtraction

Add & Subtract with negatives

KhanAcademy: https://www.khanacademy.org/commoncore/grade-7-NS#7.NS.A.1

7.NS.1 - Integer: Addition

Add SAME signs (Adding 2 positives or 2 negatives)	Add DIFFERENT signs (Adding a positive and a negative)
1. Add the absolute values 2. Sign stays the same	1. Subtract the absolute values 2. Use sign of # with larger absolute value
Try: 5 + 4 = 9 Think: *"I have 5 dollars and I get 4 more dollars. I now have a total of 9 dollars"* Try: -5 + -4 = -9 Think: *"I lost 5 dollars and then I lost 4 more dollars. Now, in total, I have lost 9 dollars"*	Try: -7 + 4 = -3 Think: *"I lost 7 dollars but then I found 4 more dollars. Overall, I am still down 3 dollars"* Try: 7 + -4 = 3 Think: *"I had 7 dollars and then I paid 4 dollars for Starbucks. Now, in total, I have 3 dollars"*

7.NS.1 - Integer: Subtraction

Change it to an addition problem by using the Additive Inverse Property

To subtract integers: "Add the opposite"

1. Keep 1st number the same, always.
2. Change subtraction to addition.
3. Change 2nd number to its opposite/additive inverse.

1. $-3+8$
2. $-10+(-2)$
3. $4+-7$
4. $6-16$
5. $7-(-6)$
6. $-3-6$
7. $2-(-9)$
8. $-1-(-3)$
9. $4-7-3-2$
10. $-10-(-2)$
11. $-7-6$
12. $6-(-16)$
13. $-7-(-6)$
14. $-3+6$
15. $3-12$
16. $-6-4$
17. $3-(-5)$
18. $-4-(-3)$
19. $6-7-3-2$
20. $-\frac{15}{5}+\frac{35}{7}$
21. $-3+-8$
22. $4+(-8)$
23. $-3+9$
24. $(-7)+(-4)$

WEEK 5

7.SP.4 - Compare Two Populations using Measures of Center & Variability

Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.

For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.

KhanAcademy: https://www.khanacademy.org/commoncore/grade-7-SP#7.SP.B.4

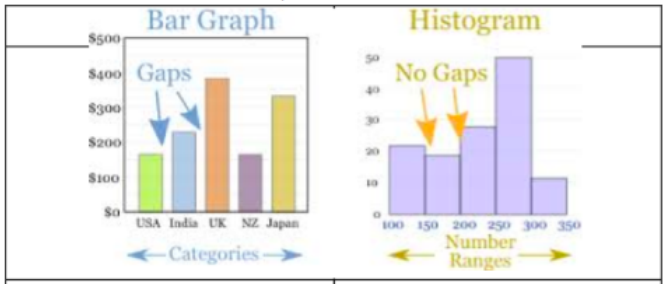
Reminder: You must demonstrate full conceptual understanding of the standard in addition to procedural mastery of the skill.

NOTES:

6.SP.4 - Display Data (Histogram)

For dot plots - See 6.SP.2 notes

Bar Graph vs Histogram



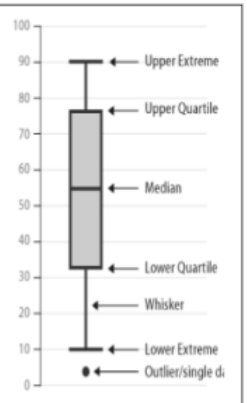
• Categorical data	• Numerical/Quantitative Data
• Single element represented by each bar	• Elements are grouped together, so that they are considered as ranges. A range/interval of elements is represented by each bar
• Bars do NOT TOUCH	• Bars touch
	Each interval/bar represent.. • An equal number of values (ie. each bar represents exactly 50 values) • That don't overlap multiple groups (ie.100-150,151-200)

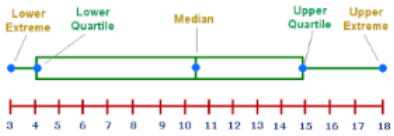
6.SP.4 - Display Data (Box & Whisker Plot)

For dot plots - See 6.SP.2 notes

Box and Whisker Plots require 5 key values to plot:

- Maximum
  - -the largest value of a set
- Q3 - Upper Quartile
  - -the number dividing the 3rd and 4th quartile
  - -the median of the upper half of the numbers
  - -also called the 75th percentile
  - -splits the lowest 75% of data from highest 25%
- Q2 - Median
  - -a simple measure of central tendency
  - -middle number when data ordered
  - -splits the lowest 50% of data from highest 50%
- Q1 - Lower Quartile
  - -the number dividing the 1st and 2nd quartile
  - -the median of the lower half of the numbers
  - -also called the 25th percentile
  - -splits the lowest 25% of data from highest 75%
- Minimum
  - -the smallest value of a set
- Outlier
  - -marked by a single dot, not part of box or whiskers

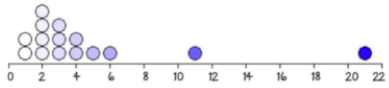




6.SP.2 - Describe Data

Dot Plot

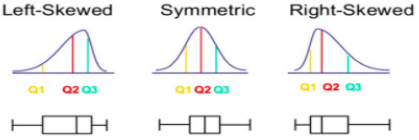
Each dot represents a number from the data.
Sample data set: 1, 1, 2, 2, 2, 2, 3, 3, 3, 4, 4, 5, 6, 11, 21



Pros
--Easy to see the range
--Easy to see the mode

Cons
--TIME CONSUMING if you have a large amount of data/numbers to graph

Distribution Shape



Cluster, Peak, Gaps

Cluster - when data seems to be "gathered" around a particular value
Peak - a large number of respondents or a high rate at a certain point along the x axis
Gap - an interval that contains no data

Outlier

A value that "lies outside" (is much smaller or larger than) most of the other values in a set of data. Must mathematically prove its an outlier.
A number is defined as an outlier if it is:

- Greater than Q3 + 1.5 * IQR
- Less than Q1 - 1.5 * IQR

See notes on Box/Whisker Plots for definition of Q1, Q3, IQR

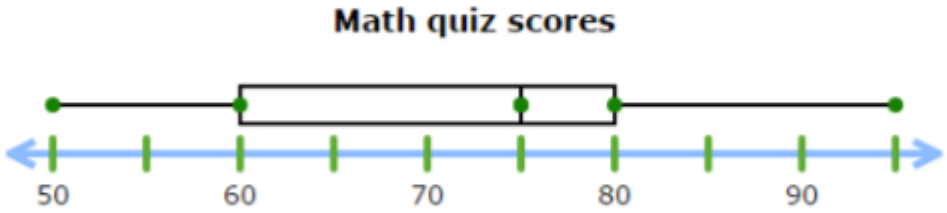
WEEK 5

7.SP.4 - Compare Two Populations using Measures of Center & Variability

SKILL PRACTICE

Q1: The principal of the school is looking over grade reports, specifically scores on math quizzes.

This box-and-whisker plot shows the results.
Find **median and range** in the given box plot:



Median = _____ and **Range** = _____

Q18: Stephen and Xavier teach classes across the hall from each other. Both teachers gave their classes the same pop quiz on the best practice for training circus animals.
The table (shown below) shows the scores of 10 random students from the Stephen's class.
The mean and mean absolute deviation are given for the scores in Xavier's class.

Complete the table. (Round to the nearest integer.)

	Mean score	Mean absolute deviation (MAD)
Xavier's class	56	7
Stephen's class	?	?

Stephen's class mean score: _____

Stephen's class MAD: _____

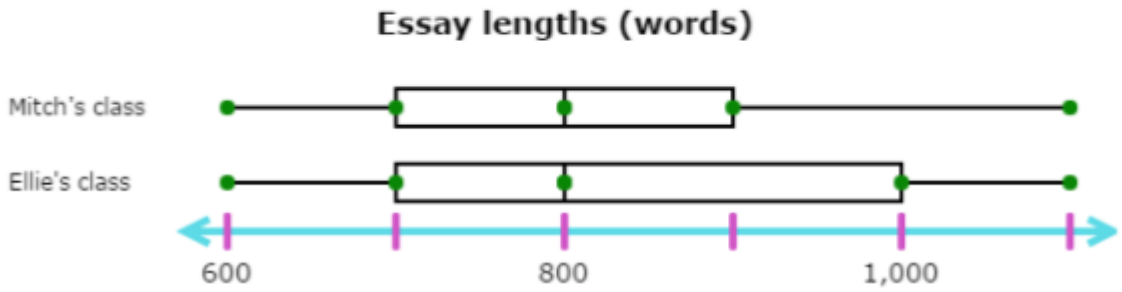
Scores in Stephen's class
34
43
45
46
49
55
65
76
78
89

WEEK 5

7.SP.4 - Compare Two Populations using Measures of Center & Variability

STANDARD PRACTICE

Q4: Two English teachers, Mitch and Ellie, are comparing the lengths of their students' latest essays. These box-and-whisker plots show the results.



Which class has the larger upper quartile?

a

Which class has the lower lower quartile?

b

Which class has the most essays?

c

Q11: The leaders of two youth sports teams randomly select five members of each team and record their ages, as shown.

- Team A: 16, 13, 12, 16, 13
- Team B: 10, 13, 16, 16, 10

Which statement appropriately compares the ages of the team members?

A Members of Team A and members of Team B are likely the same average (mean) age.

B Members of Team A are likely younger, and they have less variability in their ages.

C Members of Team A are likely older, and they have more variability in their ages.

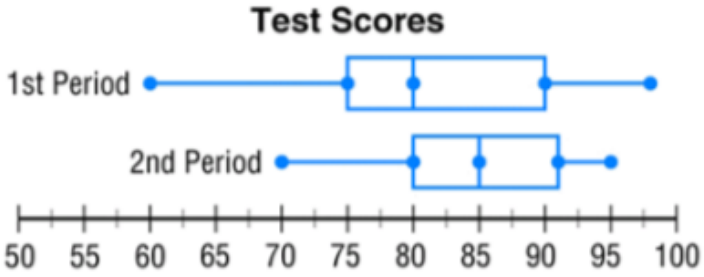
D Members of Team A are likely older, and they have less variability in their ages.

WEEK 5

7.SP.4 - Compare Two Populations using Measures of Center & Variability

PRACTICE QUIZ

Q7: The double box-and-whisker plot shows the test scores earned in Ms. Ricks' first and second period classes. Based on the information presented, select all the statements that correctly compare to the two classes.



- **A** The highest score was obtained in Ms. Ricks' second period class.
- **B** The lowest score was obtained in Ms. Ricks' first period class.
- **C** The Interquartile Range (IQR) is higher in Ms. Ricks' first period class.
- **D** The Interquartile Range (IQR) is higher in Ms. Ricks' second period class.
- **E** Ms. Ricks' first period scored better overall than second period.
- **F** Ms. Ricks' second period scored better overall than first period.

WEEK 6

Daily Memorization

7.NS.1 - Rational Operations Addition & Subtraction

Add & Subtract with negatives

CONTINUED

KhanAcademy: https://www.khanacademy.org/commoncore/grade-7-NS#7.NS.A.1

See notes from week 5

Find each sum.

1) $3+(-7)$

2) $(-10)+12$

3) $(-5)+8$

4) $(-4)+6$

5) $(-8)+12$

6) $6+(-11)$

7) $(-7)+2$

8) $(-12)+(-5)$

9) $(-12)+(-1)$

10) $(-9)+11$

11) $(-4)+(-8)+11$

12) $3+(-11)+8$

13) $(-4)+6+(-3)$

14) $1+(-4)+10$

15) $(-5)+(-5)+1$

16) $1+(-3)+11$

17) $(-9)+4+7$

18) $(-12)+4+8$

19) $3+(-10)+6$

20) $(-3)+3+12$

Find each difference.

21) $5-8$

22) $6-5$

23) $(-2)-(-8)$

24) $3-8$

25) $4-3$

26) $(-6)-5$

27) $5-6$

28) $1-1$

29) $(-3)-6$

30) $3-(-2)$

31) $5-3-(-2)$

32) $7-(-6)-7$

33) $(-4)-(-8)-2$

34) $(-2)-(-1)-(-7)$

35) $2-(-5)-3$

36) $(-7)-(-7)-4$

37) $(-6)-4-(-4)$

38) $(-8)-(-8)-5$

39) $(-5)-6-(-6)$

40) $6-(-3)-1$

KhanAcademy.org has a ton of practice with Operations with Negatives under 7.NS.1

WEEK 6

7.EE.1 - Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

KhanAcademy: https://www.khanacademy.org/commoncore/grade-7-EE#7.EE.A.1

Reminder: You must demonstrate full conceptual understanding of the standard in addition to procedural mastery of the skill.

NOTES:

Distributive Property	(see notes on p. 31 for more details)
5(2y+3) = 10y + 15	
Combine Like Terms	(see notes on p. 32 for more details)
3h+h+5 = 4h +5	
Associative Property	In *addition* & *multiplication*, it does not matter how the numbers are grouped
(1+2)+4 = 1+(2+4)	
Commutative Property	Order does not matter for *addition* & *multiplication*
1+2 = 2+1	
Additive Inverse	"Add the opposite" instead of subtracting Change subtraction to addition and then change the second number to its opposite
2 - 4 = 2 + -4	
Multiplicative Inverse	Dividing by a number is the same as multiplying by its reciprocal
d / 2 = d * ½	

Identifying Terms and Like Terms

Identify the terms and like terms in the expression $8x - 4 + 6 - x$.

Terms: $8x$, -4, 6, $-x$

Like terms: $8x$ and $-x$, -4 and 6

Linear Expressions	$-5x$	$4x + 6$	$6 - \frac{1}{7}x$
Nonlinear Expressions	x^2	$-8x^3 + x$	$x^6 + 2$

SUBTRACTING Rational Numbers

To subtract one linear expression from another, add the opposite of each term in the expression. You can use a vertical or a horizontal method.

Factor an Expression

When **factoring an expression**, you write the expression as a product of factors. You can use the Distributive Property to factor expressions.

Factor $12x - 18$.

Find the GCF of $12x$ and 18 by writing their prime factorizations.

$12x = \boxed{2} \cdot 2 \cdot 3 \cdot x$

$18 = \boxed{2} \cdot 3 \cdot 3$

Circle the common prime factors.

So, the GCF of $12x$ and 18 is $2 \cdot 3 = 6$. Use the GCF to factor the expression.

$12x - 18 = 6(2x) - 6(3)$ Rewrite using GCF.

$= 6(2x - 3)$ Distributive Property.

WEEK 6

7.EE.1 - Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

SKILL PRACTICE

Add / Subtract

1) $(3x + 5) + (5x - 2)$

2) $(6x^2 + 5) + (-5x^2 + 3)$

3) $(6x + 6) + (-3 - 4x)$

4) $(4x - 6) - (-4 - 8x)$

5) $(6p + 4) + (-5p + 8)$

6) $(-1 - 3n) + (6 + 2n)$

7) $(-8r + 8) + (-7 - 7r)$

8) $(8r - 6) + (-2r - 7)$

WEEK 6

7.EE.1 - Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

SKILL PRACTICE

Factor Expressions

Factor the following algebraic expressions:

9) $6x + 24$

10) $8x^2 - 4x$

11) $6xy + 10x^2y$

12) $m^4 - 3m^2$

13) $6x^2 + 8x + 12yx$

Expand / Simplify

15) $10x + 36 - 38x - 47$

16) $-2(7 - n) + 4$

17) $-8(-5b + 7) + 5b$

18) $-4p - (1 - 6p)$

19) $4 - 5(-4n + 3)$

20) $-7(k - 8) + 2k$

21) $1 + 7(1 - 3b)$

22) $3 - 8(7 - 5n)$

WEEK 6

7.EE.1 - Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

STANDARD PRACTICE

1. Which expression represents the sum of (2x – 5y) and (x + y)?

2. In the following equation, a and b are both integers. a(3x – 8) = b – 18x
   a. What is the value of a?
   b. What is the value of b?

3. Write the expression in standard form: $-3(2d) + (-5e + 6) + (3d - e)$

4. When $\frac{5}{8}x + 1\frac{1}{3}$ is subtracted from $1\frac{1}{4}x - 5\frac{1}{6}$, the result is _____

WEEK 6

7.EE.1 - Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

PRACTICE QUIZ

1) Write the sum of $-5x-7+6$ and $-4+3x$ in standard form.

2) Write the difference of $-5x-7+6$ and $-4+3x$ in standard form.

3) Write the following expression in standard form by expanding and collecting like terms: $3(4a+6)+2(a-10)$

4) Write the following expression in standard form:
$-3 \cdot 2 \cdot a+5(-7b)+(12 \cdot c \cdot 4)$

WEEK 7

Daily Memorization

7.NS.1 - Rational Operations Addition & Subtraction

Add & Subtract with negatives

INCLUDING DECIMALS & FRACTIONS

KhanAcademy: https://www.khanacademy.org/commoncore/grade-7-NS#7.NS.A.1

Continue practicing with addition and subtraction, now using rational numbers (fractions / decimals)

1) $6.5 + (-3.7) + (-3.6)$

2) $(-2.7) - 6.9 - 5.9$

3) $5.2 - 4.9 - (-4.3)$

4) $(-\frac{8}{6}) + \frac{3}{4}$

5) $\frac{6}{5} + \frac{2}{8} + \frac{9}{5}$

6) $\frac{5}{9} - (-\frac{8}{6})$

7) $(-1.6) - (-5.6)$

8) $3.6 + 5.2$

9) $(-1.3) + 1.8$

10) $\frac{6}{8} + (-\frac{5}{3}) + \frac{9}{8}$

11) $\frac{2}{7} - (-\frac{6}{8})$

12) $(-2.1) + (-1.3)$

13) $\frac{4}{5} - (-\frac{9}{3}) - (-\frac{7}{5})$

14) $(-4.9) - 4.2$

WEEK 7

7.EE.4 - Construct Equations & Inequalities to Solve Problems

Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

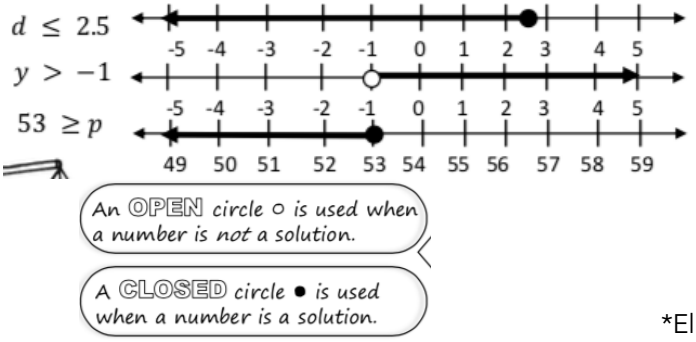
7.EE.4.A -- Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.
For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

7.EE.4.B -- Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.
For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.

KhanAcademy: https://www.khanacademy.org/commoncore/grade-7-EE#7.EE.B.4
https://www.khanacademy.org/commoncore/grade-7-EE#7.EE.B.4a
https://www.khanacademy.org/commoncore/grade-7-EE#7.EE.B.4b

Reminder: You must demonstrate full conceptual understanding of the standard in addition to procedural mastery of the skill.

NOTES: And Don't Call Me After Midnight!



(Additive Inverse)
1. Distributive Property
2. Combine Like Terms
3. Move variable to one side
4. Undo any Addition/Subtraction
5. Undo any Multiplication/Division

*Change subtraction to additive inverse ("add the opposite")
*Eliminate fractions by multiplying everything by the denominator

When solving a two-step equation, the inverse operations are applied in the opposite order from the order used when simplifying an expression: first, addition or subtraction; then multiplication or division.

Isolate the variable by performing the same operation on both sides of the equation.

Solve each equation.

1) $-3x + 4 = -2$

$-3x + 4 = -2$ — Subtract 4 from both sides.
$-4 \quad -4$
$\frac{-3x}{-3} = \frac{-6}{-3}$ — Divide both sides by -3.
$x = 2$

2) $-\frac{y}{7} + 5 = 9$

$-\frac{y}{7} + 5 = 9$ — Subtract 5 from both sides.
$-5 \quad -5$
$(-7)\left(-\frac{y}{7}\right) = 4(-7)$ — Multiply both sides by -7.
$y = -28$

WEEK 7

7.EE.4 - Construct Equations & Inequalities to Solve Problems

SKILL PRACTICE

Equations

1) $3\left(a-\frac{2}{3}\right)=\frac{3}{4}a+2\frac{1}{4}$

2) $6=4x-3+5x$

3) $\frac{7}{4}x-3=2+\frac{9}{2}x$

4) $8(-3k+4)=-88$

5) $\frac{1}{3}-\frac{2}{9}m=15+m$

6) $90=4-2(5m-3)$

7) $\frac{1}{6}r+2=4\frac{1}{9}r+\frac{8}{3}$

8) $-8+6(7-5x)=214$

WEEK 7

7.EE.4 - Construct Equations & Inequalities to Solve Problems

SKILL PRACTICE

Inequalities

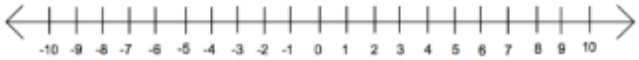
Solve and Graph.

1. $18 + 7n + 3 + 6n \leq 86$

2. $3(x - 2) > 21$

3. $-2(y + 3) \leq 12$

4. $\frac{2}{5}(x + 10) \geq 2$



5. $-5x + 4(x - 2) < 0$

WEEK 7

7.EE.4 - Construct Equations & Inequalities to Solve Problems

STANDARD PRACTICE

1. At the zoo, there are 3 fewer ferrets than twice the number of tigers. If there are 21 ferrets, what's an equation for the number of tigers at the zoo?

2. Jenna bought enough lattes for all her friends. Each latte was $3.50 and she gave the barista a $20 bill, who then gave her back $2.50 in change. Write an equation modeling this, with x as the cost per latte. How many lattes did she buy?

3. The perimeter of a square is 15 feet. What's an equation for finding the length of one of its sides (s)? How long is each side?

4. Yvette can spend no more than $100 at her local armory this week. She spends $35 on potions and wants to spend the rest on swords. If each sword costs $5, write an inequality for the number of swords she can buy.

5. Barbara made $310.05 this week, and she's ready to spend it all. She buys 45 kittens and still has $3.60 left over. How much was each kitten? What equation did you use to solve this?

6. Solve $50x - 18 < 7$ and graph the solution on a number line.

7. If John buys 8 jackets at x dollars apiece and 2 movie tickets at $11 apiece, what's the most he can spend on each jacket if his total budget is $200?

8. Laura sells used cars, and she really needs to make at least $1055 at her job this month to cover her bills. If she gets a monthly salary of $600, plus $45.50 for each car she sells, what's an inequality that shows this? Will she be okay if she sells 8 cars?

9. The sum of three consecutive odd numbers is 21. What's an equation representing this?

10. Using the information from the previous problem, what are the three numbers?

WEEK 7

7.EE.4 - Construct Equations & Inequalities to Solve Problems

PRACTICE QUIZ

For his birthday, Benny wants to invite friends to go bowling. There are two bowling alleys near his house, and the costs for birthday parties at both are shown below.

Gutter Guys	Strike Force
$200 for up to 20 people $10 for each person thereafter	$80 set-up fee $8 per person

Benny used this information to create the expressions below, where x is the number of people at the party.

- Gutter Guys: $200 + 10(x - 20)$
- Strike Force: $80 + 8x$

He then set up and solved the following inequality to determine the number of people for which Gutter Guys costs less:

$$\begin{aligned}
\text{Step 1}: \quad & 200 + 10(x - 20) \leq 80 + 8x \\
\text{Step 2}: \quad & 200 + 10x - 20 \leq 80 + 8x \\
\text{Step 3}: \quad & 180 + 10x \leq 80 + 8x \\
\text{Step 4}: \quad & 2x \leq 100 \\
\text{Step 5}: \quad & x \leq 50
\end{aligned}$$

Based on this result, Benny told his mother, "If we invite fewer than 50 people to the party, the Gutter Guys costs less. Since I'm inviting only 18 people, I think Gutter Guys is the better deal."

1. Is Benny's argument reasonable? Explain why or why not.

2. Determine the number of people for which Gutter Guys is less expensive than Strike Force. Set up equations or inequalities based on the information provided and then solve the problem. Show all of your work.

3. Interpret your solution from part C in terms of the context of the problem. When is Gutter Guys the better deal? When is Strike Force the better deal? Which bowling alley costs less for Benny's party?

WEEK 8

Daily Memorization

7.NS.2 - Rational Operations Multiplication & Division

Multiply and Divide with negatives

INCLUDING DECIMALS & FRACTIONS

KhanAcademy: https://www.khanacademy.org/commoncore/grade-7-NS#7.NS.A.2

Practice of Multiplication / Division with Rational Numbers (fractions / decimals)

1) -5.5×-4.87

2) 1.7×-2.1

3) 0.2×-1.6

4) 1.7×-3.1

5) -4.6×-7.2

6) -5.928×-11.6

7) $3 \cdot -\frac{9}{5}$

8) $-\frac{3}{2} \cdot \frac{3}{10}$

9) $-2 \cdot \frac{6}{5}$

10) $2 \cdot -\frac{6}{7}$

11) $\frac{-8}{5} \div \frac{-5}{3}$

12) $\frac{4}{3} \div \frac{-3}{2}$

WEEK 8

7.NS.1 - Add/Subtract Rational Numbers

Apply & extend previous understandings of addition and subtraction to add & subtract rational numbers; represent addition & subtraction on a horizontal or vertical number line diagram.

7.NS.1.A - Describe situations in which opposite quantities combine to make 0. For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.

7.NS.1.B - Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.

7.NS.1.C - Understand subtraction of rational numbers as adding the additive inverse, p - q = p + (-q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.

7.NS.1.D - Apply properties of operations as strategies to add & subtract rational numbers.Use variables to represent quantities in a real-world or mathematical problem, & construct simple equations & inequalities to solve problems by reasoning about the quantities.

7.NS.2 - Multiply/Divide Rational Numbers

Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

7.NS.2.A - Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (-1)(-1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.

7.NS.2.B - Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then -(p/q) = (-p)/q = p/(-q). Interpret quotients of rational numbers by describing real-world contexts.

7.NS.2.C -- Apply properties of operations as strategies to multiply and divide rational numbers.

7.NS.2.D -- Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.

7.NS.3 - Solve Rational Operations in Context

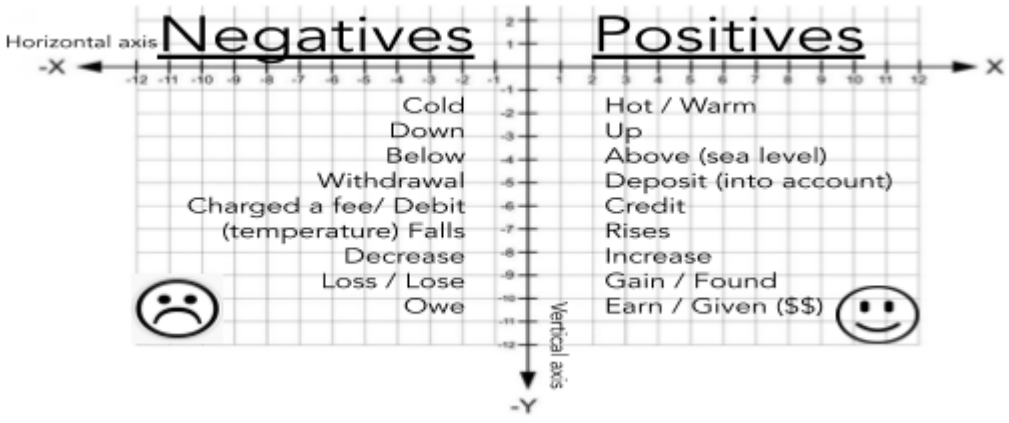
Solve real-world and mathematical problems involving the four operations with rational numbers.

Computations with rational numbers extend the rules for manipulating fractions to complex fractions.

KhanAcademy: https://www.khanacademy.org/commoncore/grade-7-NS

Reminder: You must demonstrate full conceptual understanding of the standard in addition to procedural mastery of the skill.

NOTES:



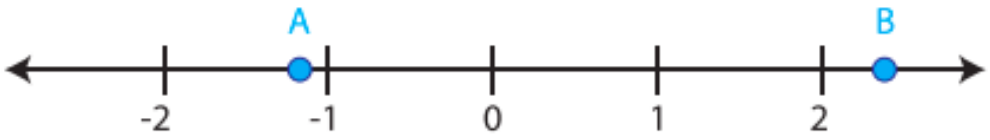
WEEK 8

7.NS.3 - Solve Rational Operations in Context

SKILL PRACTICE

1. Determine the difference.
    a. 2 – 6
    b. 2 – (-6)
    c. -2 – 6
    d. -2 – (-6)

2. Determine whether each of the expressions below has a value that is positive, negative, or equal to 0. Explain your reasoning.



    a. a+1
    b. b+(-1)
    c. a+(-2)
    d. a+(-a)
    e. a+b

3. Evaluate, then describe your strategy for calculating differences in problems involving decimals.
    a. 2 – 6.3
    b. 2 – (-6.3)

4. Louise claims that subtracting a negative number is equivalent to adding that number. For example, 2.3 – (-4) = 2.3 + 4. Do you agree with Louise? Justify your response mathematically using a picture or a number line.

5. Decide whether the following expressions are equal.
    a. -4 – 12 = 12 – (-4)
    b. 3 – 10 = 10 – 3
    c. 5 – (-2) = -2 – 5

6. Is it possible for a – b to equal b – a? Explain your reasoning.

WEEK 8

7.NS.3 - Solve Rational Operations in Context

STANDARD PRACTICE

1) At noon the temperature was -3° C. Over the next four hours the temperature dropped another 15 degrees. Then every hour until 7:00 the temperature rose 2 degrees. What was the temperature at 7:00?

2) Paige was playing a trivia game where you gained points for correct answers and lost points for incorrect answers. At the start of round 3 she was at -700 points. During the round she answered eight 400 point questions correct and she answered nine 600 points questions incorrect. What was her score at the end of the round?

3) Rachel and 4 friends were going to the movies. Each ticket cost $11 and then they bought 2 popcorns at $3.5 a piece and then each person bought their own soda at $3.75 each. How much money did they spend total for their trip to the movies?

4) A restaurant chef was ordering supplies. He ordered 4 pounds of beef at 9.25 per pound, 6 pounds of potatoes at $6.96 a pound and 5 pounds of carrots at $9.81 per pound. He estimates that this will make 28 meals. If he charges 48.32 per meal how much profit will he make?

WEEK 8

7.NS.3 - Solve Rational Operations in Context

PRACTICE QUIZ

1) Suzy gets on the elevator on the ground floor. She goes up 3 floors, down 2 floors, up 7 floors, up 2 floors, down 5 floors and up 8 floors. What floor is she on?

2) Mt. Everest, the highest elevation in Asia, is 29,028 feet above sea level. The Dead Sea, the lowest elevation, is 1312 feet below sea level. What is the difference between these two elevations?

3) A submarine was situated 800 ft below sea level. If it ascends 250 ft, descends 300 ft and ascends 75 ft, what is its new position?

4) The highest recorded temperature on Earth is 136 °F . The lowest is − 129 °F . What is the difference between these temperatures?

5) A company has a profit of $150 a week for 9 weeks. It then has a loss of $65 a week for 25 weeks. At the end of 34 weeks what is the company's profit or loss?

PRACTICE QUIZ

Daily Memorization -- Weeks 4-8

7.NS.1 - Add/Subtract Rational Numbers
7.NS.2 - Multiply/Divide Rational Numbers

a) $2 + (- 7) =$ _____

b) $0 - (- 4) =$ _____

c) $56 \div (- 8) =$ _____

d) $- 63 \div 9 =$ _____

e) $-5 \times -6 =$ _____

f) $60 \div (-10) =$ _____

g) $-9 - (-10) =$ _____

h) $-7 \times -8 =$ _____

i) $56 \div -8 =$ _____

j) $7 + (- 8) =$ _____

ANSWER KEY #1

Skill / Standard Practice + Daily Memorization

WEEK 1 // 6.NS.3

SKILL

Add	1) 5.7	2) 15.5	3) 11.72	4) 262.191	5) 107.197
Subtract	1) 4.1	2)12.9	3) 1.79	4) 28.84	5) 22.092
Multiply	1) 0.72	2) 0.635	3) 67.2	4) 0.01488	5) 28.32
Divide	1) 0.8	2) 0.25	3) 6.85	4) $10.\overline{3}$	5) 120

STANDARD

1) Multiply $6.45
2) Subtract 1.54miles
3) Add 15.7764km
4) Divide 4.4 pounds
5) Add, then Subtract $24.85
6) Divide, then round 40 DVDs (cost $40.46)
7) Multiply, then Add $11.63 total (2boats=$7.76 and 3balls=$3.87)
8) Add, then Subtract $38.95 left

WEEK 2 // 5.NF.1

SKILL

1) $\frac{3}{20}$
2) $\frac{55}{4} = 13\frac{3}{4}$
3) $\frac{7}{6} = 1\frac{1}{6}$
4) $\frac{55}{4} = 13\frac{3}{4}$
5) $\frac{35}{24} = 1\frac{11}{24}$
6) $\frac{61}{8} = 7\frac{5}{8}$
7) $\frac{13}{14}$
8) $\frac{38}{11} = 3\frac{5}{11}$

STANDARD

1) $\frac{13}{24}$
2) $\frac{39}{12} = 3\frac{1}{4}$
3) $\frac{22}{15} = 1\frac{7}{15}$
4) $\frac{29}{60}$

WEEK 3 // 6.EE.1

SKILL

Whole Numbers

1) 51 2) 66 3) 81 4) 8

Whole Numbers with Exponents

5) 79 6) 54 7) 25 8) 66

Integers with Exponents

9) -66 10) -36 11) -53 12) 46

Rational Numbers with Exponents

13) -14.7 14) -77.63 15) $-\frac{1}{6}$ 16) $-\frac{7}{50}$

WEEK 4 // Daily Memorization // 7.NS.2 Multiply/Divide Integers

1. –48	2. 45	3. 7	4. –4	5. –72	6. 36	7. –45
8. –12	9. 8	10. –7	11. 9/16	12. –27		13. 42
14. 24	15. –6	16. 7	17. –6	18. –25	19. –36	20. 16

WEEK 4 // 7.SP.3

SKILL

Q12) C

Q4) Top: Company C Middle: Company A Bottom: Company B

STANDARD

Q10) a. Greater than b. Less than

Q2) 5

WEEK 5 // Daily Memorization // 7.NS.1 Add/Sub Integers

1. 5	2. –12	3. –3	4. –10	5. 13	6. –9	7. 11	8. 2
9. –8	10. –8	11. –13	12. 22	13. –1	14. 3	15. –9	16. –10
17. 8	18. –1	19. –6	20. 2	21. –11	22. –4	23. 6	

WEEK 5 // 7.SP.4

SKILL

Q1) Median=75 Range=45 // Q18) Mean = 52 MAD = 15

STANDARD

Q4) a. Mitch's class /b. Both classes the same/ c. Can't tell from this graph Q11) D

WEEK 6 // Daily Memorization // 7.NS.1 Add/Subtract Integers

1) –4	2) 2	3) 3	4) 2
5) 4	6) –5	7) –5	8) –17
9) –13	10) 2	11) –1	12) 0
13) –1	14) 7	15) –9	16) 9
17) 2	18) 0	19) –1	20) 12
21) –3	22) 1	23) 6	24) –5
25) 1	26) –11	27) –1	28) 0
29) –9	30) 5	31) 4	32) 6
33) 2	34) 6	35) 4	36) –4
37) –6	38) –5	39) –5	40) 8

WEEK 6 // 7.EE.1

SKILL PRACTICE

Add / Subtract	Factor Expressions	Expand / Simplify
1) 8x+3	9) 6(x + 4)	15) -28x-11
2) x^2+8	10) 4x(2x − 1)	16) -10+2n
3) 2x+3	11) 2xy(3 + 5x)	17) 45b - 56
4) 12x-2	12) m2 (m2 − 3)	18) 2p-1
5) p+12	13) 2x(3x + 4 + 6y)	19) -11+20n
6) -n+5		20) -5k+56
7) -15r+1		21) 8-21b
8) 6r-13		22) -53+40

STANDARD PRACTICE

1) 3x-4y
2) a = -6 b = 48
3) $-3d-6e+6$
4) $\frac{5}{8}x-6\frac{1}{2}$

WEEK 7 // Daily Memorization // 7.NS.1 Add/Subtract Rational Numbers

1) -0.8 2) -15.5 3) 4.6 4) $-\frac{7}{12}$ 5) $\frac{13}{4} = 3\frac{1}{4}$ 6) $\frac{17}{9} = 1\frac{8}{9}$ 7) 4

8) 8.8 9) 0.5 10) $\frac{5}{24}$ 11) $\frac{29}{28} = 1\frac{1}{28}$ 12) -3.4 13) $\frac{26}{5} = 5\frac{1}{5}$ 14) -9.1

WEEK 7 // 7.EE.4

SKILL

Equations 1) $a = 1\frac{8}{9}$ 2) x = 1 3) $x = -1\frac{9}{11}$ 4) k = 5

5) $m = -12$ 6) m = -8 7) $r = -\frac{12}{71}$ 8) x = -6

Inequalities 1) $n \leq 5$ closed dot, shaded left. 2) $x > 9$ open dot, shaded right

3) $y \leq -9$ closed dot, shaded left 4) $x \geq -5$ closed dot, shaded right

5) $x > -8$ open dot, shaded right *when you multiply/divide by a negative you flip the inequality*

STANDARD

1) 2t − 3 = 21

2) 20 − 3.5x = 2.5, which means x = 5 lattes.

3) equation: 4s = 15, so s = 3.75 ft

4) inequality: 5s + 35 ≤ 100, or s ≤ 13

5) equation: 45k + 3.6 = 310.05, each kitten cost $6.81

6) The solution is x < 0.5 (open dot, shade left)

7) No more than $22.25 per Jacket ($22.25 or less)

8) inequality: 45.5c + 600 ≥ 1055, so c ≥ 10. That means she needs to sell at least 10 cars, so 8 won't quite get her enough money.

9) Odd numbers increase by 2 every time, so our equation is x+ (x+ 2)+ (x+ 4) = 21, or 3x+ 6 = 21, where x is the first number.

10) The numbers are 5, 7, and 9.

WEEK 8 // Daily Memorization // 7.NS.2 Multiply/Divide Rational Numbers

1) 26.785 2) −3.57 3) −0.32 4) −5.27 5) 33.12 6) 68.7648

7) $-\frac{27}{5} = -5\frac{2}{5}$ 8) $-\frac{9}{20}$ 9) $-\frac{12}{5} = -2\frac{2}{5}$ 10) $-\frac{12}{7} = -1\frac{5}{7}$ 11) $\frac{24}{25}$ 12) $-\frac{8}{9}$

WEEK 8 // 7.NS.3

SKILL

1a) -4 1b) 8 1c) -8 1d) 4

2a) negative 2b) positive 2c) negative 2d) equal to zero (additive inverse) 2e) positive

3a) -4.3 3b) 8.3

4) Yes this is true. You change subtraction to add the opposite, and the opposite of a negative number is a positive number. On a number line you would take away a negative amount, which is the same as getting positive back.

5a) no $(-16 \neq 16)$ 5b) no $(-7 \neq 7)$ 5c) no $(-7 \neq 7)$

6) It is only possible when both a and b are equal $(a = b)$.

For example, if a=5 and b=5 then 5-5 = 0 and 5-5=0.

However it otherwise is not true as order is significant in subtraction.

STANDARD

1) -3+(-1×15)+((7-4)×2) = 451.52

2) -700+(8×400)+(9×600×-1) = -12

3) (11×(4+1)) + (2×3.5) + (3.75×(4+1)) =-2,900

4) = 11,225.15

ANSWER KEY #2

PRACTICE QUIZZES

WEEK 1 // 6.NS.3

1. Divide. Gold price in 2010 is about 34 times the price in 1974.
2a. Add. 0.298oz
2b. Multiply. $10.73
2c. Subtract. $354.18

WEEK 2 // 5.NF.1

1. $\frac{7}{8}$ 2. Baby by $\frac{1}{10}$ of a day 3. $\frac{1}{12}$ 4. 45 times

WEEK 3 // 6.EE.1

1) -1 2) -27.72 3) $-2\frac{9}{20}$ 4) $3\frac{3}{8}$

WEEK 4 // 7.SP.3

Q8) B

WEEK 5 // 7.SP.4

Q7) B, C, F

WEEK 6 // 7.EE.1

1. -2x-7y+2
2. -8x+3
3. 14a-2
4. -6a-35b +48c

WEEK 7 // 7.EE.4

A sample level 4 response follows.

Part 1: "Benny's expressions work as long as you are talking about 20 or more people. But Gutter Guys charges a $200 flat rate for up to 20 people, so the model does not always work. Benny's conclusion is about fewer than 20 people, but the model is not correct for that many people. Also, Benny made mistakes in his calculations, so his conclusion is based on faulty mathematical reasoning. Ironically, it happens to be true that Gutter Guys is less expensive for 18 people, because 200 < 80 + 8(18) = 80 + 80 + 64 = 224."

Part 2, sample response:
"A complete solution needs two inequalities, one for when x < 20 and one for when x > 20.
When x ≤ 20: 200 < 80 + 8x → 120 < 8x → 15 < x.
When x>20: 200+10(x – 20) < 80+8x →200+10x – 200 < 80 + 8x →10x < 80 + 8x →2x < 80 →x < 40.
Gutter Guys is less expensive for 15 < x < 40. To confirm, do some test cases..

Part 3, sample response: "Gutter Guys is the better deal for more than 15 people and fewer than 40 people. Strike Force is the better deal for more than 40 people or fewer than 15 people. Since Benny is inviting 18 people, and 18 is greater than 15 but less than 40, Gutter Guys costs less for Benny's party."

WEEK 8 // 7.NS.3

1) 3+(-2)+7+2+(-5)+8=13th floor
2) 29,028 − (-1312) = 30,340 ft
3) -800+250+(-300)+75= − 775 ft
4) 136 − (-129) = 265 °F
5) 150(9) + (-65)(25) = − 275 so company had a loss of $275

ANSWER KEY #2

PRACTICE QUIZZES
Daily Memorization

MEMORIZATION WEEKS 1-3 // PDFs

Fraction *simplest*	Decimal	Percent
$\frac{1}{3}$	$0.\overline{3}$	$33.\overline{3}\%$
$\frac{1}{4}$	0.25	25%
$\frac{7}{10}$	0.7	75%
$\frac{3}{5}$	0.6	60%
$\frac{4}{5}$	0.8	80%
$\frac{2}{5}$	0.4	40%
$\frac{1}{5}$	0.2	20%
$\frac{5}{8}$	0.625	62.5%
$\frac{3}{8}$	0.375	37.5%
$\frac{7}{8}$	0.875	87.5%
$\frac{1}{8}$	0.125	12.5%
$\frac{2}{3}$	$0.\overline{6}$	$66.\overline{6}\%$
$\frac{3}{4}$	0.75	75%
$\frac{1}{20}$	0.05	5%
$1\frac{1}{20}$	1.05	105%

MEMORIZATION WEEKS 4-8 // Operations w/ Negatives

a) 2 + (− 7) = ____-5_____

b) 0 − (− 4) = ____4_____

c) 56 ÷ (− 8) = _____-7_____

d) − 63 ÷ 9 = _____-7_____

e) -5 × -6 = ____30_____

f) 60 ÷ (-10) = _____-6_____

g) -9 – (-10) = _____1_____

h) -7 × -8 = _____56_____

i) 56 ÷ -8 = ____-7_____

j) 7 + (- 8) = ___-1_____