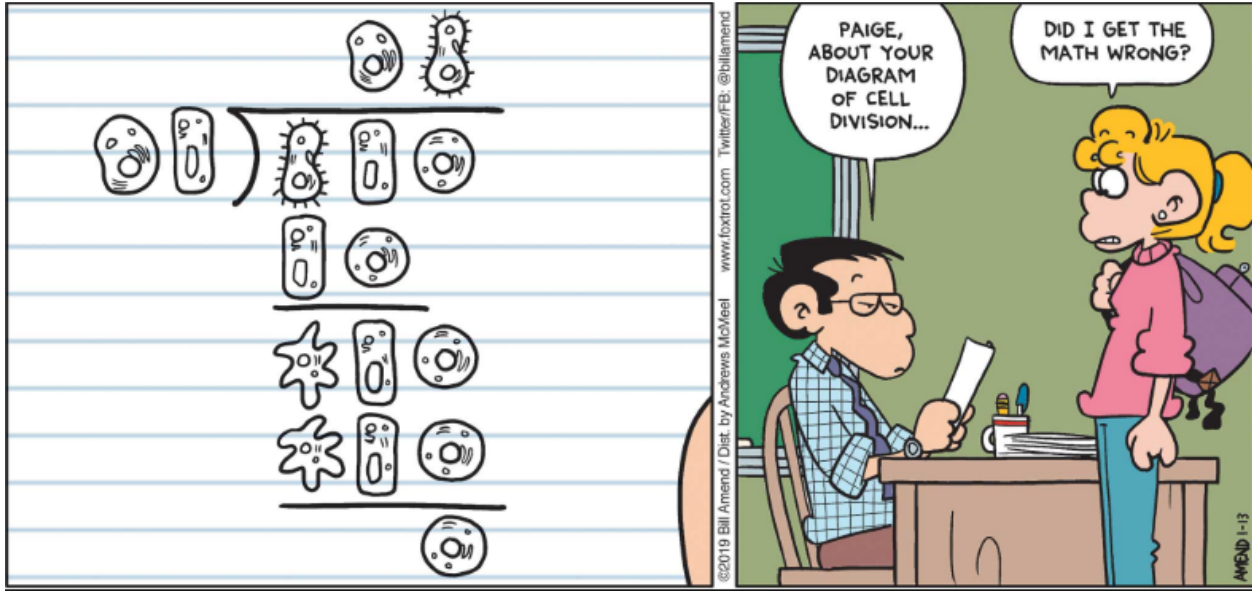


2019 Incoming 8th Graders



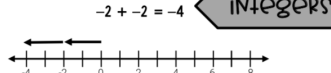
Directions:

- **Do four problems a week.** There is one page for each week of the summer, and each page has four problems.
 - If you are going to be away for a few weeks, it is okay to double up on weeks when you are home.
 - The goal of summer math homework is to keep your skills fresh, so try to spread your work out over the summer instead of doing it all the weekend before school starts ;-)
- **Show your work for each problem** so we can know what you did to solve it when we look at it in September.
- **If you struggle with a problem,**
 - Look at the reference sheet for help
 - Try your best
 - Circle the problem so we know in the fall which ones were challenging for you
- **Bring your work with you** to the first day of class in September.

Reference Sheet

ADDITION

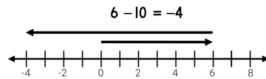
- If the signs are the **SAME**, then **ADD** and use the same sign.
- If the signs are **DIFFERENT**, then **SUBTRACT** and **TAKE THE SIGN** of the number with the **GREATEST ABSOLUTE VALUE**.



INTEGERS

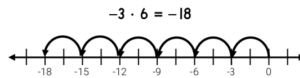
SUBTRACTION

- Rewrite the problem to **ADD THE OPPOSITE**. Then, follow the rules for adding rational numbers.



MULTIPLICATION & DIVISION

- If there is an **EVEN NUMBER** of signs, then the solution is **POSITIVE**.
- If there is an **ODD NUMBER** of signs, then the solution is **NEGATIVE**.



SOLVING EQUATIONS

Use **INVERSE OPERATIONS** to **UNDO** the equation.

- undo addition or subtraction $6x + 7 = 31$
- undo multiplication or division $6x = 24$
- isolate the variable $x = 4$
- check your work $6(4) + 7 = 31$

CONSTANT OF PROPORTIONALITY

$$k = \frac{y}{x}$$

CONSTANT OF PROPORTIONALITY:

the ratio of the y-value to the x-value, represented by "k", it is equal to the rate of change

EXAMPLE:

X	2	4	6
Y	62	124	186

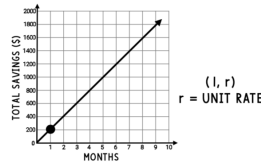
$k = \frac{62}{2}$
 $k = 31$

X-VALUE

- independent
- measured
- x-axis
- left side of table
- top row of table

Y-VALUE

- dependent
- varies
- y-axis
- right side of table
- bottom row of table



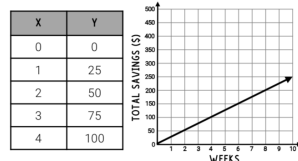
TABLES & GRAPHS

PROPORTIONAL VS. NON-PROPORTIONAL

- An equation, table, graph, or verbal description can describe the relationship between x and y.

PROPORTIONAL RELATIONSHIP

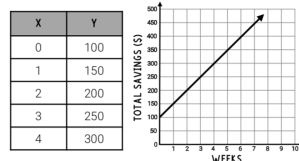
$$y = ax$$



- Passes through the origin, (0, 0)
- Straight line

NON-PROPORTIONAL RELATIONSHIP

$$y = x + a$$



- Does not pass through the origin, (0, 0)
- Not a straight line

Cross Canceling

- When multiplying fractions, we can simplify the fractions and also simplify diagonally. This isn't necessary, but it can make the numbers smaller and keep you from simplifying at the end.
- From the last slide: $\frac{2}{5} \cdot \frac{9}{2} = \frac{2 \cdot 9}{5 \cdot 2} = \frac{18}{10} \cdot \frac{+2}{+2} = \frac{9}{5} = 1 \frac{4}{5}$
- An alternative: $\frac{1}{5} \cdot \frac{9}{2} = \frac{1 \cdot 9}{5 \cdot 1} = \frac{9}{5} = 1 \frac{4}{5}$

You do not have to cross cancel, it is just an option. If you are more comfortable, multiply across and simplify at the end.

Order of Operations

P	Parentheses	()
E	Exponents	e^2
M	Multiplication	\times
D	Division	\div
A	Addition	$+$
S	Subtraction	$-$

whichever comes first
Left Right
 M^* D^*
whichever comes first
Left Right
 A^* S^*

ORIGINAL EXPRESSION

PROPERTY

EQUIVALENT EXPRESSION

$8 + 0$	IDENTITY	0
$6 \cdot 3 \cdot 2$	COMMUTATIVE	$3 \cdot 2 \cdot 6$
$6 + (3 + 2)$	ASSOCIATIVE	$(6 + 3) + 2$
$8(x + 7)$	DISTRIBUTIVE	$8x + 56$

PROPERTIES OF OPERATIONS RESULT IN EQUIVALENT EXPRESSIONS

The **RECIPROCAL** of a number results in a **PRODUCT OF 1**.

$$\frac{5}{6} \cdot \frac{6}{5} = 1$$

FLIP

PROPERTIES OF OPERATIONS

Week 1

Sunday, June 23 - Saturday, June 29

Problem 1	Simplify $- 5(5 - 1) + 2 \cdot 4$										
Problem 2	Simplify $3x + 5 - 8x + 6$										
Problem 3	Find the unit rate <table><tr><td>hours</td><td>3</td><td>8</td><td>12</td><td>15</td></tr><tr><td>bagels</td><td>540</td><td>1,440</td><td>2,160</td><td>2,700</td></tr></table>	hours	3	8	12	15	bagels	540	1,440	2,160	2,700
hours	3	8	12	15							
bagels	540	1,440	2,160	2,700							
Problem 4	A soccer league split 128 players evenly among 8 teams. How many players were on each team?										

Week 2

Sunday, June 30 - Saturday, July 6

Problem 1	Simplify $-5.28 + 3.46$
Problem 2	Solve $-3x = -36$
Problem 3	Find the unit rate, then write a $y = mx$ equation to represent the cost, y , of x cans of corn. <i>5 cans of corn cost \$5.95</i>
Problem 4	Will saved \$50 a week for x weeks. He has \$650 in his account. Write an equation that represents this situation and can be used to determine how many weeks Will had been saving.

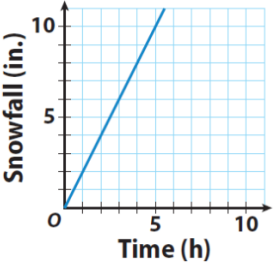
Week 3

Sunday, July 7 - Saturday, July 13

Row 1	<p>Simplify</p> $1 + 1 - (-5 - 4)$
Row 2	<p>Solve</p> $3(2x - 5) + 2x - 1 = -32$
Row 3	<p>The two equations below show the total meters traveled, y in x seconds. Who is travelling at a faster rate? How much faster are they going?</p> <p>Tom's equation: $y = 4.5x$ Julie's equation: $y = 3.8x$</p>
Row 4	<p>A size 8 kids' shoe measures $9\frac{2}{3}$ inches. If 5 pairs of size 8 kids' shoes are lined end to end, then how many inches will they cover?</p>

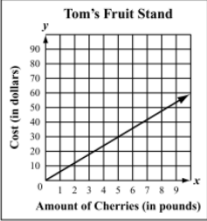
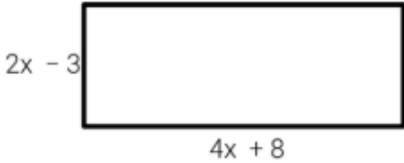
Week 4

Sunday, July 14 - Saturday, July 20

Problem 1	<p>Determine the missing card value that will result in a product of -324.</p> <div><div>-6</div><div>3</div><div>-9</div><div>?</div></div>
Problem 2	<p>Solve</p> $3 + \frac{x}{2} = 7$
Problem 3	<p>Find the unit rate and give an equation that represents the graph.</p> <p>Misty Mountain Storm</p> 
Problem 4	<p>A pillowcase requires $1\frac{1}{3}$ yards of material. If Mrs. Novak plans to sew 6 pillowcases, how much material does she need?</p>

Week 5

Sunday, July 21 - Saturday, July 27

<p>Problem 1</p>	<p>Simplify</p> $68 \div -1.6$
<p>Problem 2</p>	<p>Solve</p> $\frac{2}{5}x = 12$
<p>Problem 3</p>	<p>Julia and Tom each have a fruit stand. The information in the boxes below can be used to determine the costs, in dollars, of cherries at the two fruit stands.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>Julia's Fruit Stand</p> $y = 4.5x$ where y equals the total cost, in dollars, of x pounds of cherries </div> <div style="text-align: center;">  </div> </div> <p>Based on the information, which of the following statements best compares the costs of cherries at the two fruit stands?</p> <ol style="list-style-type: none"> Cherries cost \$1.50 more per pound at Julia's Fruit Stand than at Tom's Fruit Stand. Cherries cost \$2.50 more per pound at Julia's Fruit Stand than at Tom's Fruit Stand. Cherries cost \$1.50 more per pound at Tom's Fruit Stand than at Julia's Fruit Stand. Cherries cost \$2.50 more per pound at Tom's Fruit Stand than at Julia's Fruit Stand.
<p>Problem 4</p>	<p>If the perimeter of the rectangle is 118 units, what is the value of x?</p> <div style="text-align: center;">  </div>

Week 6

Sunday, July 28 - Saturday, August 3

Problem 1	<p>Simplify</p> $\frac{1}{2} \cdot \frac{4}{5}$										
Problem 2	<p>Solve</p> $-4(-3x + 4) - 8 = -84$										
Problem 3	<p>Find the unit rate and give an equation that represents the table.</p> <table><thead><tr><th>Time (hours)</th><th>Distance (miles)</th></tr></thead><tbody><tr><td>2</td><td>90</td></tr><tr><td>3</td><td>135</td></tr><tr><td>5</td><td>225</td></tr><tr><td>6</td><td>270</td></tr></tbody></table>	Time (hours)	Distance (miles)	2	90	3	135	5	225	6	270
Time (hours)	Distance (miles)										
2	90										
3	135										
5	225										
6	270										
Problem 4	<p>A tree trunk is being cut down to form four equal stumps. The trunk of the tree measures $8\frac{2}{3}$ feet in length.</p>										

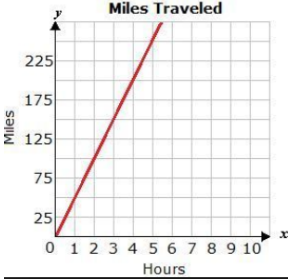
Week 7

Sunday, August 4 - Saturday, August 10

Problem 1	<p>Simplify</p> $-\frac{3}{2} \div -\frac{6}{11}$										
Problem 2	<p>Solve</p> $-1.7x = -51$										
Problem 3	<p>1. The table below shows the cost of a certain number of pounds of apples.</p> <table><tr><th>Pounds</th><th>Cost</th></tr><tr><td>4</td><td>\$5.52</td></tr><tr><td>8</td><td>\$11.04</td></tr><tr><td>12</td><td>\$16.56</td></tr><tr><td>16</td><td>\$22.08</td></tr></table> <p>a. What is the slope, or rate of change?</p> <p>b. Is the table proportional? How do you know?</p> <p>c. Write an equation for the table.</p>	Pounds	Cost	4	\$5.52	8	\$11.04	12	\$16.56	16	\$22.08
Pounds	Cost										
4	\$5.52										
8	\$11.04										
12	\$16.56										
16	\$22.08										
Problem 4	<p>A home improvement store advertises 60 square feet of flooring for \$453, which includes an installation fee of \$80. What is the cost per square foot of flooring?</p>										

Week 8

Sunday, August 11 - Saturday, August 17

Problem 1	<p>Simplify</p> $\frac{1}{5} \cdot \frac{10}{11}$										
Problem 2	<p>Simplify</p> $-6(4x - 3)$										
Problem 3	<p>Find the unit rate</p>  <table border="1"><caption>Data points from the 'Miles Traveled' graph</caption><thead><tr><th>Hours (x)</th><th>Miles (y)</th></tr></thead><tbody><tr><td>0</td><td>0</td></tr><tr><td>2</td><td>75</td></tr><tr><td>4</td><td>150</td></tr><tr><td>6</td><td>225</td></tr></tbody></table>	Hours (x)	Miles (y)	0	0	2	75	4	150	6	225
Hours (x)	Miles (y)										
0	0										
2	75										
4	150										
6	225										
Problem 4	<p>Translate the written expression into an algebraic expression</p> <p><i>A number cubed plus four</i></p>										

Week 9

Sunday, August 18 - Saturday, August 24

Problem 1	Simplify $\frac{7}{8} \div \frac{3}{4}$										
Problem 2	Solve $2x - 1 = -15$										
Problem 3	Find the unit rate, then write a $y = mx$ equation to represent the miles y , for x minutes. <table><tr><td>minutes</td><td>5</td><td>8</td><td>10</td><td>12</td></tr><tr><td>miles</td><td>0.625</td><td>1</td><td>1.25</td><td>1.5</td></tr></table>	minutes	5	8	10	12	miles	0.625	1	1.25	1.5
minutes	5	8	10	12							
miles	0.625	1	1.25	1.5							
Problem 4	Justine baked 3 dozen cupcakes in 40 minutes. How long would it take her to bake 5 dozen cupcakes?										

Week 10

Sunday, August 25 - Saturday, August 31

Problem 1	<p>Simplify</p> $\frac{4}{5} \cdot 4$
Problem 2	<p>Solve</p> $\frac{x+5}{3} = 4$
Problem 3	<p>Find the unit rate and write an equation that shows the relationship between the total cost, y for x books</p> <p><i>Mrs. Daniels participates in a classroom book service where each book costs the same amount. She paid \$22.80 for 8 books in her classroom.</i></p>
Problem 4	<p>The local volleyball team hosts a concession stand to raise money. They can spend \$120 to purchase popcorn, candy, and drinks. They purchase 95 bags of popcorn at \$0.75 each and 35 bags of candy at \$1.20 each. How much money does the volleyball team have left to spend on drinks?</p>