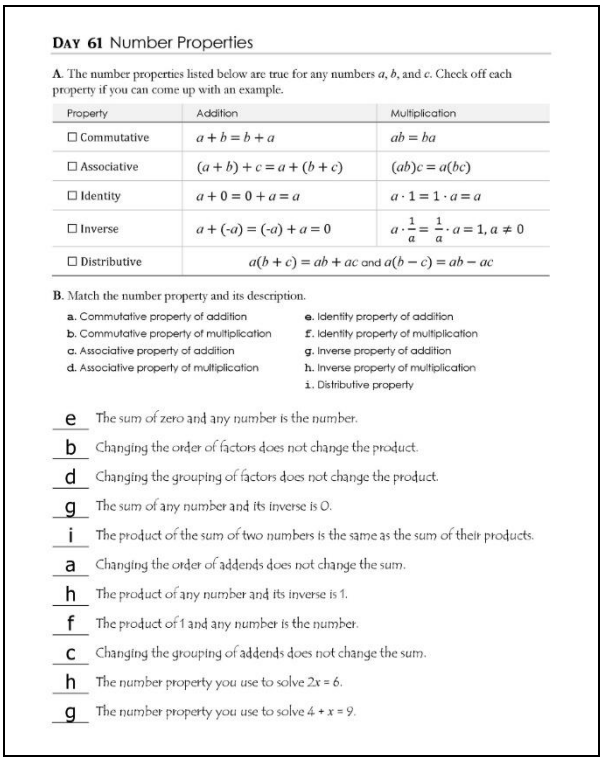
Day 61



DAY 61 Number Properties

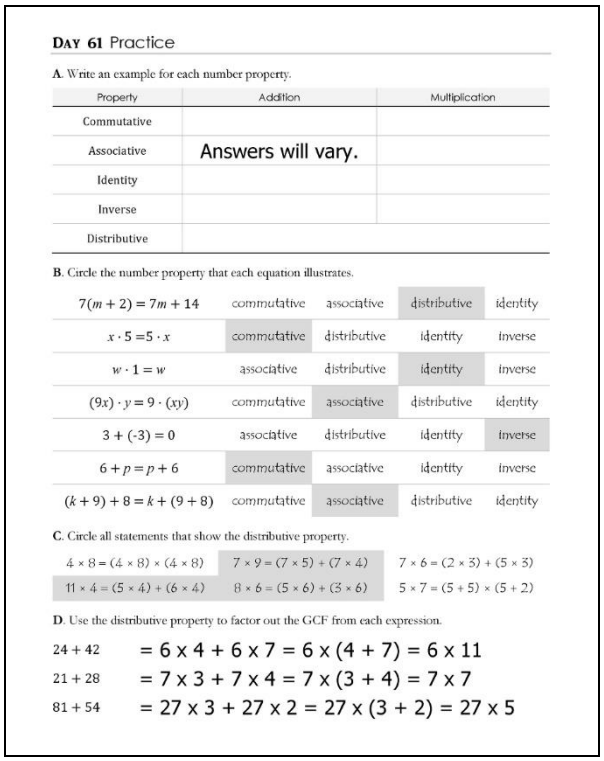
A. The number properties listed below are true for any numbers a, b, and c. Check off each property if you can come up with an example.

Property	Addition	Multiplication
☐ Commutative	$a + b = b + a$	$ab = ba$
☐ Associative	$(a + b) + c = a + (b + c)$	$(ab)c = a(bc)$
☐ Identity	$a + 0 = 0 + a = a$	$a \cdot 1 = 1 \cdot a = a$
☐ Inverse	$a + (-a) = (-a) + a = 0$	$a \cdot \frac{1}{a} = \frac{1}{a} \cdot a = 1, a \neq 0$
☐ Distributive	$a(b + c) = ab + ac$ and $a(b - c) = ab - ac$	

B. Match the number property and its description.

a. Commutative property of addition
b. Commutative property of multiplication
c. Associative property of addition
d. Associative property of multiplication
e. Identity property of addition
f. Identity property of multiplication
g. Inverse property of addition
h. Inverse property of multiplication
i. Distributive property

e The sum of zero and any number is the number.
b Changing the order of factors does not change the product.
d Changing the grouping of factors does not change the product.
g The sum of any number and its inverse is 0.
i The product of the sum of two numbers is the same as the sum of their products.
a Changing the order of addends does not change the sum.
h The product of any number and its inverse is 1.
f The product of 1 and any number is the number.
c Changing the grouping of addends does not change the sum.
h The number property you use to solve $2x = 6$.
g The number property you use to solve $4 + x = 9$.



DAY 61 Practice

A. Write an example for each number property.

Property	Addition	Multiplication
Commutative		
Associative	Answers will vary.	
Identity		
Inverse		
Distributive		

B. Circle the number property that each equation illustrates.

$7(m + 2) = 7m + 14$	commutative	associative	distributive	identity
$x \cdot 5 = 5 \cdot x$	commutative	distributive	identity	inverse
$w \cdot 1 = w$	associative	distributive	identity	inverse
$(9x) \cdot y = 9 \cdot (xy)$	commutative	associative	distributive	identity
$3 + (-3) = 0$	associative	distributive	identity	inverse
$6 + p = p + 6$	commutative	associative	identity	inverse
$(k + 9) + 8 = k + (9 + 8)$	commutative	associative	distributive	identity

C. Circle all statements that show the distributive property.

$4 \times 8 = (4 \times 8) \times (4 \times 8)$	$7 \times 9 = (7 \times 5) + (7 \times 4)$	$7 \times 6 = (2 \times 3) + (5 \times 3)$
$11 \times 4 = (5 \times 4) + (6 \times 4)$	$8 \times 6 = (5 \times 6) + (3 \times 6)$	$5 \times 7 = (5 + 5) \times (5 + 2)$

D. Use the distributive property to factor out the GCF from each expression.

24 + 42 = 6 x 4 + 6 x 7 = 6 x (4 + 7) = 6 x 11
21 + 28 = 7 x 3 + 7 x 4 = 7 x (3 + 4) = 7 x 7
81 + 54 = 27 x 3 + 27 x 2 = 27 x (3 + 2) = 27 x 5

Day 61 Lesson – Number Properties

These are the rules of arithmetic, like the laws of physics, things that are just always true, except even more so. Sometimes we find out that a law of science really wasn't true, and God even just breaks those laws sometimes. Math laws are ALWAYS true.

They've seen these already. They can substitute numbers in for the variables to convince themselves the rules are true. They know that a + b = b + a. That means that 1 + 3 = 3 + 1. And they know that a + 0 = a. That means that 5 + 0 = 5. Now they just have to relax into describing it with variables and work on being familiar with the terminology.

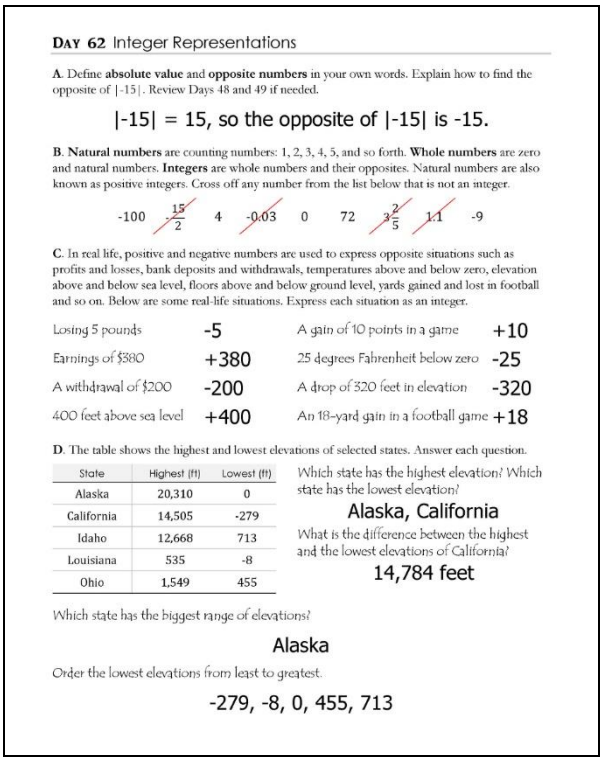
Commutative is about moving, like your commute to work.
Associative is about grouping, like who you associate with.
Identity is about staying the same, like keeping true to who you are, maintaining your identity.
Inverse is about the opposite, like something inverted or upside down.
Distributive is about passing out a number, distributing it to each piece.

Day 61 Review – Positive and Negative Numbers

They are just going to write the number and add a negative sign if it represents a value less than zero.

Answers +78 -1,000 +1,500

Day 62



Day 62 Integer Representations

A. Define **absolute value** and **opposite numbers** in your own words. Explain how to find the opposite of |-15|. Review Days 48 and 49 if needed.

|-15| = 15, so the opposite of |-15| is -15.

B. **Natural numbers** are counting numbers: 1, 2, 3, 4, 5, and so forth. **Whole numbers** are zero and natural numbers. **Integers** are whole numbers and their opposites. Natural numbers are also known as positive integers. Cross off any number from the list below that is not an integer.

-100 $-\frac{15}{2}$ 4 -0.03 0 72 $3\frac{2}{5}$ 1.1 -9

C. In real life, positive and negative numbers are used to express opposite situations such as profits and losses, bank deposits and withdrawals, temperatures above and below zero, elevation above and below sea level, floors above and below ground level, yards gained and lost in football and so on. Below are some real-life situations. Express each situation as an integer.

Losing 5 pounds	-5	A gain of 10 points in a game	+10
Earnings of $380	+380	25 degrees Fahrenheit below zero	-25
A withdrawal of $200	-200	A drop of 320 feet in elevation	-320
400 feet above sea level	+400	An 18-yard gain in a football game	+18

D. The table shows the highest and lowest elevations of selected states. Answer each question.

State	Highest (ft)	Lowest (ft)
Alaska	20,310	0
California	14,505	-279
Idaho	12,668	713
Louisiana	535	-8
Ohio	1,549	455

Which state has the highest elevation? Which state has the lowest elevation?

Alaska, California

What is the difference between the highest and the lowest elevations of California?

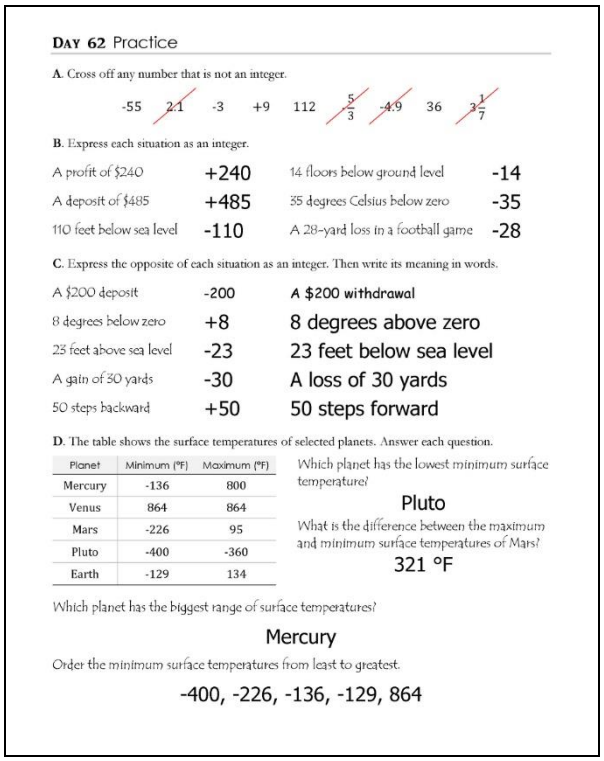
14,784 feet

Which state has the biggest range of elevations?

Alaska

Order the lowest elevations from least to greatest.

-279, -8, 0, 455, 713



Day 62 Practice

A. Cross off any number that is not an integer.

-55 2.1 -3 +9 112 $\frac{5}{3}$ -4.9 36 $3\frac{1}{7}$

B. Express each situation as an integer.

A profit of $240	+240	14 floors below ground level	-14
A deposit of $485	+485	35 degrees Celsius below zero	-35
110 feet below sea level	-110	A 28-yard loss in a football game	-28

C. Express the opposite of each situation as an integer. Then write its meaning in words.

A $200 deposit	-200	A $200 withdrawal
8 degrees below zero	+8	8 degrees above zero
23 feet above sea level	-23	23 feet below sea level
A gain of 30 yards	-30	A loss of 30 yards
50 steps backward	+50	50 steps forward

D. The table shows the surface temperatures of selected planets. Answer each question.

Planet	Minimum (°F)	Maximum (°F)
Mercury	-136	800
Venus	864	864
Mars	-226	95
Pluto	-400	-360
Earth	-129	134

Which planet has the lowest minimum surface temperature?

Pluto

What is the difference between the maximum and minimum surface temperatures of Mars?

321 °F

Which planet has the biggest range of surface temperatures?

Mercury

Order the minimum surface temperatures from least to greatest.

-400, -226, -136, -129, 864

Day 62 Lesson – Integer Representations

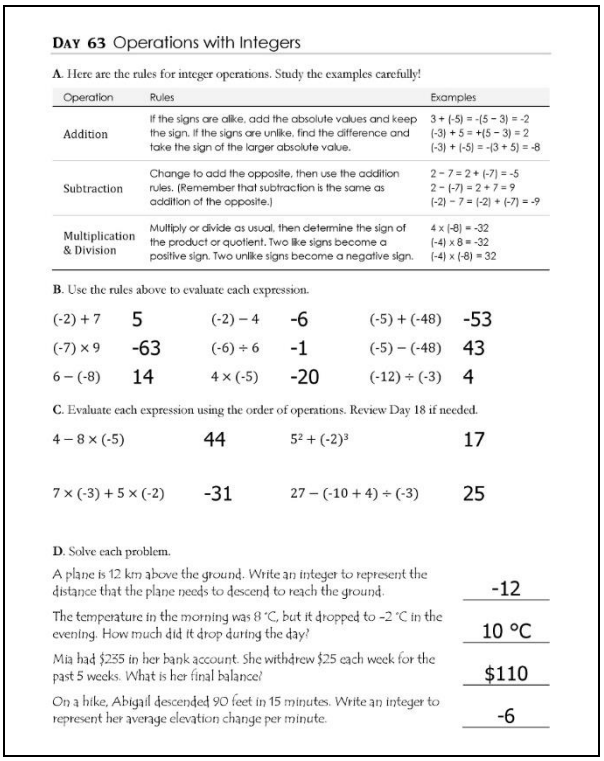
This is again looking at positive and negative numbers, integers, and numbers in general. There is vocabulary on the page. Have your child explain them to you. There's no trick here. There are the numbers you count with, those along with zero, and those and their opposites. They each have a math name: natural numbers, whole numbers, integers.

Day 62 Review – Number Line

They need to figure out how much each line is worth. The first one has each line being five away from the next. The second line jumps by eights. The numbers will be the same on each side of zero, but the numbers on the left will be negative.

Answers -25, -15, 0, 10, 20 -48, -32, 8, 24, 48

Day 63



DAY 63 Operations with Integers

A. Here are the rules for integer operations. Study the examples carefully!

Operation	Rules	Examples
Addition	If the signs are alike, add the absolute values and keep the sign. If the signs are unlike, find the difference and take the sign of the larger absolute value.	3 + (-5) = -(5 − 3) = -2 (-3) + 5 = +(5 − 3) = 2 (-3) + (-5) = -(3 + 5) = -8
Subtraction	Change to add the opposite, then use the addition rules. (Remember that subtraction is the same as addition of the opposite.)	2 − 7 = 2 + (-7) = -5 2 − (-7) = 2 + 7 = 9 (-2) − 7 = (-2) + (-7) = -9
Multiplication & Division	Multiply or divide as usual, then determine the sign of the product or quotient. Two like signs become a positive sign. Two unlike signs become a negative sign.	4 x (-8) = -32 (-4) x 8 = -32 (-4) x (-8) = 32

B. Use the rules above to evaluate each expression.

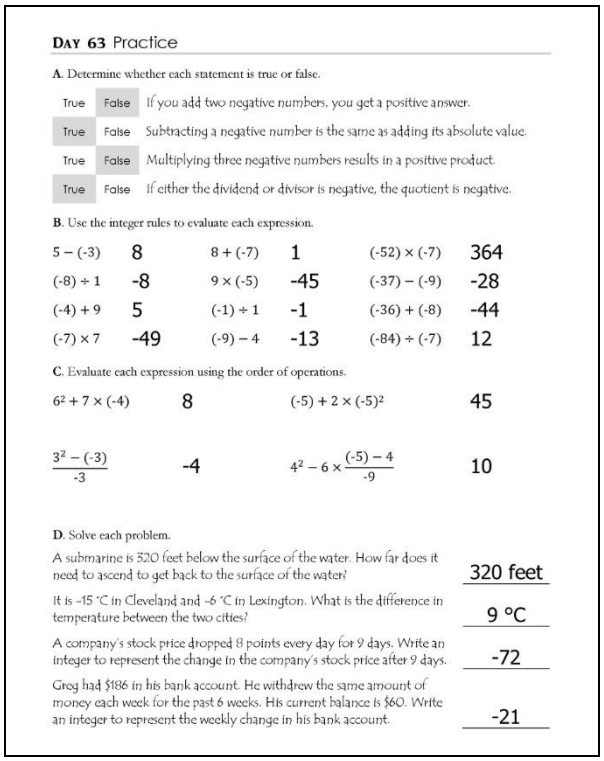
(-2) + 7	5	(-2) − 4	-6	(-5) + (-48)	-53
(-7) × 9	-63	(-6) ÷ 6	-1	(-5) − (-48)	43
6 − (-8)	14	4 × (-5)	-20	(-12) ÷ (-3)	4

C. Evaluate each expression using the order of operations. Review Day 18 if needed.

4 − 8 × (-5)	44	$5^2 + (-2)^3$	17
7 × (-3) + 5 × (-2)	-31	27 − (-10 + 4) ÷ (-3)	25

D. Solve each problem.

A plane is 12 km above the ground. Write an integer to represent the distance that the plane needs to descend to reach the ground.	-12
The temperature in the morning was 8 °C, but it dropped to -2 °C in the evening. How much did it drop during the day?	10 °C
Mia had $255 in her bank account. She withdrew $25 each week for the past 5 weeks. What is her final balance?	$110
On a hike, Abigail descended 90 feet in 15 minutes. Write an integer to represent her average elevation change per minute.	-6



DAY 63 Practice

A. Determine whether each statement is true or false.

True	False	If you add two negative numbers, you get a positive answer.
True	False	Subtracting a negative number is the same as adding its absolute value.
True	False	Multiplying three negative numbers results in a positive product.
True	False	If either the dividend or divisor is negative, the quotient is negative.

B. Use the integer rules to evaluate each expression.

5 − (-3)	8	8 + (-7)	1	(-52) × (-7)	364
(-8) ÷ 1	-8	9 × (-5)	-45	(-37) − (-9)	-28
(-4) + 9	5	(-1) ÷ 1	-1	(-36) + (-8)	-44
(-7) × 7	-49	(-9) − 4	-13	(-84) ÷ (-7)	12

C. Evaluate each expression using the order of operations.

$6^2 + 7 \times (-4)$	8	$(-5) + 2 \times (-5)^2$	45
$\frac{3^2 - (-3)}{-3}$	-4	$4^2 - 6 \times \frac{(-5) - 4}{-9}$	10

D. Solve each problem.

A submarine is 320 feet below the surface of the water. How far does it need to ascend to get back to the surface of the water?	320 feet
It is -15 °C in Cleveland and -6 °C in Lexington. What is the difference in temperature between the two cities?	9 °C
A company's stock price dropped 8 points every day for 9 days. Write an integer to represent the change in the company's stock price after 9 days.	-72
Greg had $186 in his bank account. He withdrew the same amount of money each week for the past 6 weeks. His current balance is $60. Write an integer to represent the weekly change in his bank account.	-21

Day 63 Lesson – Operations with Integers

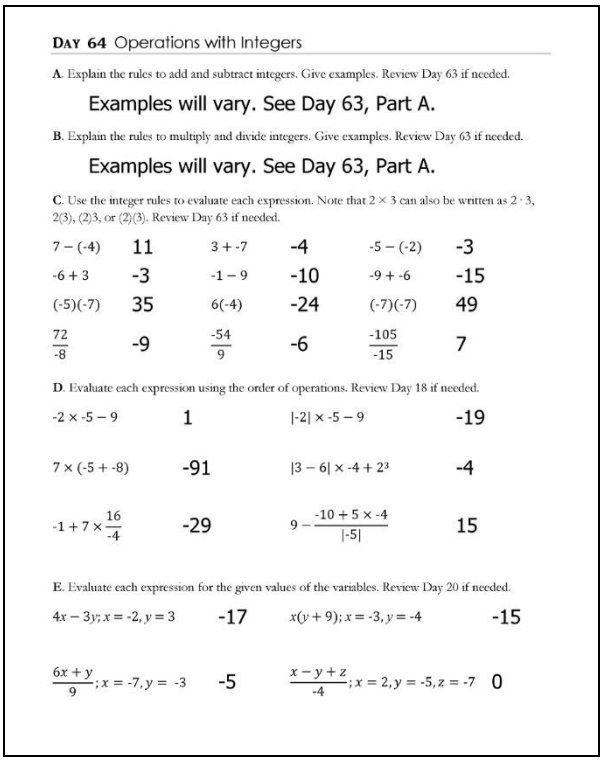
They should know how to do these operations with integers. They need to think about the sign and they need to think about order of operation. PEMDAS

Day 63 Review – Ordering Numbers

They will put the numbers in order from least to greatest, remembering that a large negative number is going to be the least in the order.

Answers -7, -3, 0, 2 -16, -2, 8, 14 -80, -16, 45, 74

Day 64



DAY 64 Operations with Integers

A. Explain the rules to add and subtract integers. Give examples. Review Day 63 if needed.

Examples will vary. See Day 63, Part A.

B. Explain the rules to multiply and divide integers. Give examples. Review Day 63 if needed.

Examples will vary. See Day 63, Part A.

C. Use the integer rules to evaluate each expression. Note that 2×3 can also be written as $2 \cdot 3$, $2(3)$, $(2)3$, or $(2)(3)$. Review Day 63 if needed.

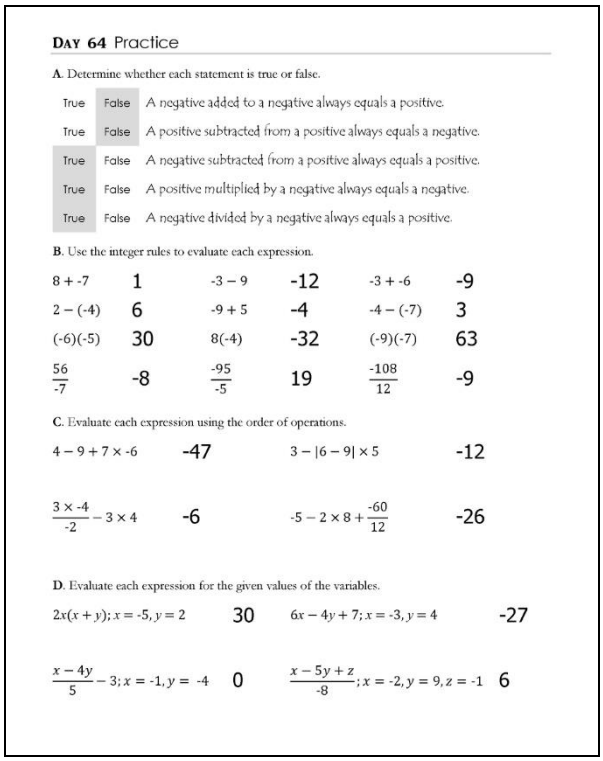
$7 - (-4)$	11	$3 + -7$	-4	$-5 - (-2)$	-3
$-6 + 3$	-3	$-1 - 9$	-10	$-9 + -6$	-15
$(-5)(-7)$	35	$6(-4)$	-24	$(-7)(-7)$	49
$\frac{72}{-8}$	-9	$\frac{-54}{9}$	-6	$\frac{-105}{-15}$	7

D. Evaluate each expression using the order of operations. Review Day 18 if needed.

$-2 \times -5 - 9$	1	$\lvert -2 \rvert \times -5 - 9$	-19
$7 \times (-5 + -8)$	-91	$\lvert 3 - 6 \rvert \times -4 + 2^3$	-4
$-1 + 7 \times \frac{16}{-4}$	-29	$9 - \frac{-10 + 5 \times -4}{\lvert -5 \rvert}$	15

E. Evaluate each expression for the given values of the variables. Review Day 20 if needed.

$4x - 3y; x = -2, y = 3$	-17	$x(y + 9); x = -3, y = -4$	-15
$\frac{6x + y}{9}; x = -7, y = -3$	-5	$\frac{x - y + z}{-4}; x = 2, y = -5, z = -7$	0



DAY 64 Practice

A. Determine whether each statement is true or false.

True	False	A negative added to a negative always equals a positive.
True	False	A positive subtracted from a positive always equals a negative.
True	False	A negative subtracted from a positive always equals a positive.
True	False	A positive multiplied by a negative always equals a negative.
True	False	A negative divided by a negative always equals a positive.

B. Use the integer rules to evaluate each expression.

$8 + -7$	1	$-3 - 9$	-12	$-3 + -6$	-9
$2 - (-4)$	6	$-9 + 5$	-4	$-4 - (-7)$	3
$(-6)(-5)$	30	$8(-4)$	-32	$(-9)(-7)$	63
$\frac{56}{-7}$	-8	$\frac{-95}{-5}$	19	$\frac{-108}{12}$	-9

C. Evaluate each expression using the order of operations.

$4 - 9 + 7 \times -6$	-47	$3 - \lvert 6 - 9 \rvert \times 5$	-12
$\frac{3 \times -4}{-2} - 3 \times 4$	-6	$-5 - 2 \times 8 + \frac{-60}{12}$	-26

D. Evaluate each expression for the given values of the variables.

$2x(x + y); x = -5, y = 2$	30	$6x - 4y + 7; x = -3, y = 4$	-27
$\frac{x - 4y}{5} - 3; x = -1, y = -4$	0	$\frac{x - 5y + z}{-8}; x = -2, y = 9, z = -1$	6

Day 64 Lesson – Operations with Integers

This is the same thing as Day 63.

(-7)(-7) means (-7) x (-7)

They will be using expressions as well. They are given four expressions in Part E. They are to substitute in the values of X and Y and Z into the expression and then solve it.

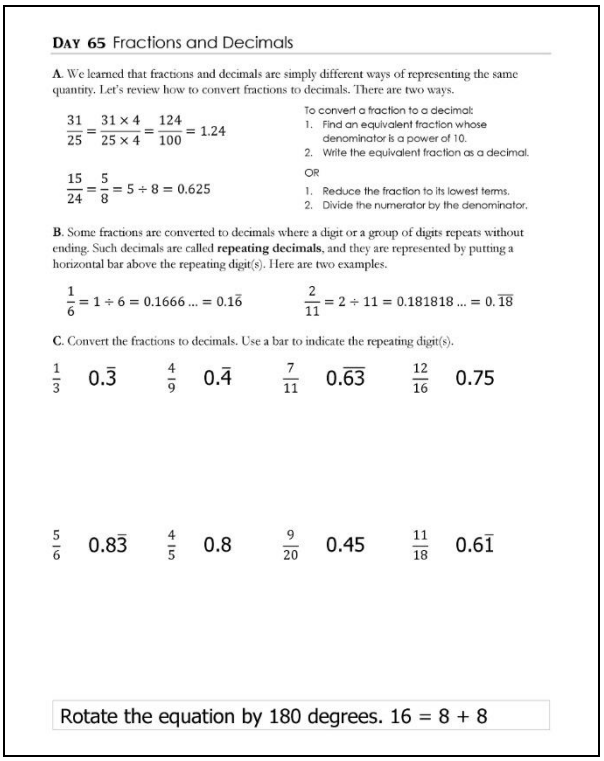
Here's the first one. 4x – 3y where x = -2 and y = 3 That becomes 4(-2) – (3x3)= -8 – 9 = -17

Day 64 Review – Opposite

This is a simple review of choosing the inverse, the opposite number to add together to make zero.

Answers 0 4 -18

Day 65



DAY 65 Fractions and Decimals

A. We learned that fractions and decimals are simply different ways of representing the same quantity. Let's review how to convert fractions to decimals. There are two ways.

$\frac{31}{25} = \frac{31 \times 4}{25 \times 4} = \frac{124}{100} = 1.24$

To convert a fraction to a decimal:
1. Find an equivalent fraction whose denominator is a power of 10.
2. Write the equivalent fraction as a decimal.

OR

$\frac{15}{24} = \frac{5}{8} = 5 \div 8 = 0.625$

1. Reduce the fraction to its lowest terms.
2. Divide the numerator by the denominator.

B. Some fractions are converted to decimals where a digit or a group of digits repeats without ending. Such decimals are called **repeating decimals**, and they are represented by putting a horizontal bar above the repeating digit(s). Here are two examples.

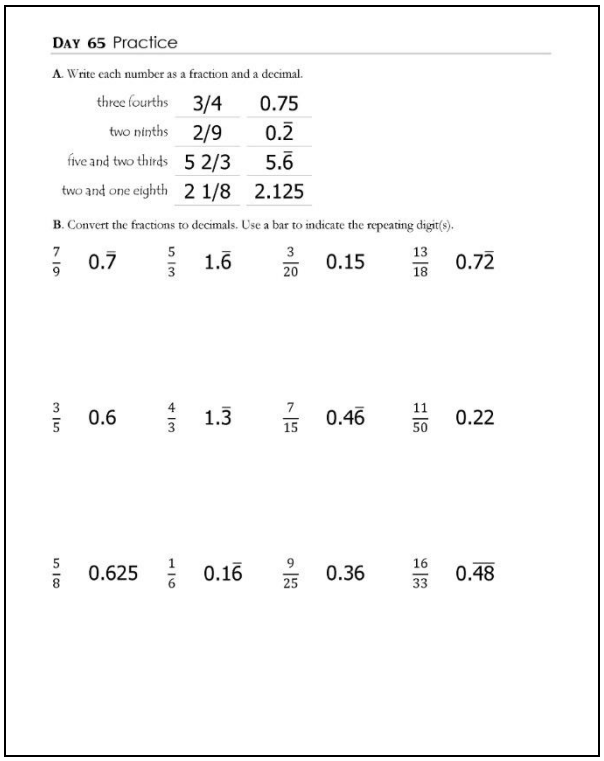
$\frac{1}{6} = 1 \div 6 = 0.1666\ldots = 0.1\overline{6}$ $\quad\quad$ $\frac{2}{11} = 2 \div 11 = 0.181818\ldots = 0.\overline{18}$

C. Convert the fractions to decimals. Use a bar to indicate the repeating digit(s).

$\frac{1}{3}$ $0.\overline{3}$ $\quad$ $\frac{4}{9}$ $0.\overline{4}$ $\quad$ $\frac{7}{11}$ $0.\overline{63}$ $\quad$ $\frac{12}{16}$ 0.75

$\frac{5}{6}$ $0.8\overline{3}$ $\quad$ $\frac{4}{5}$ 0.8 $\quad$ $\frac{9}{20}$ 0.45 $\quad$ $\frac{11}{18}$ $0.6\overline{1}$

Rotate the equation by 180 degrees. 16 = 8 + 8



DAY 65 Practice

A. Write each number as a fraction and a decimal.

three fourths	3/4	0.75
two ninths	2/9	$0.\overline{2}$
five and two thirds	5 2/3	$5.\overline{6}$
two and one eighth	2 1/8	2.125

B. Convert the fractions to decimals. Use a bar to indicate the repeating digit(s).

$\frac{7}{9}$ $0.\overline{7}$ $\quad$ $\frac{5}{3}$ $1.\overline{6}$ $\quad$ $\frac{3}{20}$ 0.15 $\quad$ $\frac{13}{18}$ $0.7\overline{2}$

$\frac{3}{5}$ 0.6 $\quad$ $\frac{4}{3}$ $1.\overline{3}$ $\quad$ $\frac{7}{15}$ $0.4\overline{6}$ $\quad$ $\frac{11}{50}$ 0.22

$\frac{5}{8}$ 0.625 $\quad$ $\frac{1}{6}$ $0.1\overline{6}$ $\quad$ $\frac{9}{25}$ 0.36 $\quad$ $\frac{16}{33}$ $0.\overline{48}$

Day 65 Lesson – Fractions and Decimals

One way to turn a fraction into a decimal is to find the equivalent fraction with a 10 or 100 in the denominator. 0.1 is one tenth, one over ten. 0.01 is one hundredth or 1 over 100.

However, that's not always going to be possible. They will, however, always be able to divide the fraction to get the equivalent decimal. They will be dividing the numerator by the denominator. They will know that they are going the correct way if the answer is smaller than one.

I'm okay with kids using a calculator to do this part. They will place a decimal point in the dividend and then add as many zeros as necessary. The decimal point goes straight up into the quotient.

Some of the answers are going to be repeating decimals and some won't. When they are dividing, they will have to keep adding a zero until they figure out the answer. Here's an example: one eighth, 1/8 You divide eight into one. It can't go in, so you add a decimal and a 0 and continue.

```
  0.125
8 | 1.000
    8
    20
    16
     40
```

Day 65 Review – Absolute Value

The absolute value is the distance to zero, basically just the number given with no sign.

Answers 0 7 13