Math 8

Gross

$$\begin{array}{r} 6 \\ \times 9 \\ \hline 54 \end{array}$$ 6 and 9 ↔ factors; 54 ← product

$$\begin{array}{r} 12 \\ +15 \\ \hline 27 \end{array}$$ 12 and 15 ↔ addens; 27 ← sum

divisor ↳ 64 | 158.72 ← dividend; 2.48 ← quotient

$$\begin{array}{r} -128 \\ \hline 307 \\ -256 \\ \hline 512 \\ -512 \\ \hline \end{array}$$

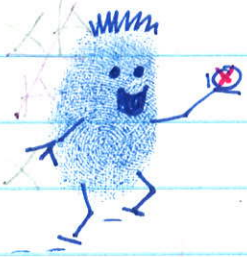
$$\begin{array}{r} 3\,\overset{4}{\cancel{5}}\,\overset{11}{\cancel{2}}.\,\overset{9}{0}\,\overset{1}{6} \\ -149.78 \\ \hline 202.28 \end{array}$$ ← difference

How to show multiplication

$7(8) = 56$

$4 \cdot 9 = 36$

$6x + 2x = 8x$



ORDER of OPERATIONS

1) PARENTHESIS
2) EXPONENTS
3) MULTIPLICATION or DIVISION (as they come)
4) ADDITION or SUBTRACTION (as they come)

$5[4 + \blacksquare \div 2]$

$5[4 + \blacksquare]$

$5[\blacksquare]$

$\blacksquare[8]$

40

Variables & Expressions

Expression:

$4x + 12$

- terms are separated by ⊕ or ⊖
- there are two terms in this expression

Equations have equal signs

$4x + 12 = 32$

$-12 \quad -12$

$\frac{4x}{4} = \frac{20}{4}$

$x = 5$ ← This is the solution!

~~$5q - 7 = 33$~~

$+7 \quad +7$

$\frac{5q}{5} = \frac{40}{5}$

~~$q = 8$~~

* this is an ~~open sentence~~
* 5 is the coefficient
* q is the variable
* 7 is a constant
* 33 is a constant
* 8 is the solution

Mrs. Gross
P2

Title Deed
Additive Identity

Rent: When 0 is added to any number, the sum is the number.

With 1 house = $8+0=8$

With 2 houses = $0+27=27$

With 3 houses = $p+0=p$

With hotel = $0+m=m$

If a player knows all the properties in math, their rent is doubled on all lots.

Title Deed
Substitution Property of Equality

Rent: If two quantities are equal, then one quantity can be replaced by the other.

(m = 8, x = 3, n = 11)

With 1 house = $6m-2x$
$6\cdot 8-2\cdot 3$

With hotel = $20-4$
16

If a player knows all the properties in math, their rent is doubled on all lots.

Title Deed
Commutative Property of Addition

Rent: The order in which numbers are added does not change the sum.

With 1 house = $2+3=3+2$

With 2 houses = $8+c=c+8$

With 3 houses = $(6+5)+9=9+(6+5)$

With hotel = $(3a+b)+2c=2c+(b+3a)$

If a player knows all the properties in math, their rent is doubled on all lots.

Title Deed
Commutative Property of Multiplication

Rent: The order in which numbers are multiplied does not change the product.

With 1 house = $4\cdot 7=7\cdot 4$

With 2 houses = $a\cdot c\cdot f=a\cdot f\cdot c$

With 3 houses = $l(w4)=(w4)l$

With hotel = $RAT=TAR$

If a player knows all the properties in math, their rent is doubled on all lots.

Title Deed
Multiplicative Identity

Rent: When any number is multiplied by 1, the product is the number.

With 1 house = $4\cdot 1=4$

With 2 houses = $49\cdot 1=49$

With 3 houses = $\Delta\cdot 1=\Delta$

With hotel = $1h=h$

If a player knows all the properties in math, their rent is doubled on all lots.

Title Deed
Multiplicative Property of Zero

Rent: When any number is multiplied by 0, the product is 0.

With 1 house = $6\cdot 0=0$

With 2 houses = $0\cdot 14=0$

With 3 houses = $r\cdot 0=0$

With hotel = $5t\cdot 0=0$

If a player knows all the properties in math, their rent is doubled on all lots.

Title Deed
Associative Property of Addition

Rent: The way in which numbers are grouped when added does not change the sum.

With 1 house = $(5+8)+2 = 5+(8+2)$

With hotel = $6+(9+e) = (6+9)+e$

If a player knows all the properties in math, their rent is doubled on all lots.

Title Deed
Associative Property of Multiplication

Rent: The way in which numbers are grouped does not change the product.

With 1 house = $(4 \cdot 6)3 = 4(6 \cdot 3)$

With 2 houses = $p(ot) = t(op)$

With hotel = $12(y \cdot 6) = (12 \cdot 6)y$

If a player knows all the properties in math, their rent is doubled on all lots.

Title Deed
Symmetric Property of Equality

Rent: If one quantity equals a second quantity, then the second quantity also equals the first.

With 1 house = if $10 = 4+6$ then $4+6 = 10$

With 2 houses = if $3 \cdot 5 = 15$ then $15 = 3 \cdot 5$

With hotel = if $a = b$ then $b = a$

If a player knows all the properties in math, their rent is doubled on all lots.

Title Deed
Transitive Property of Equality

Rent: If one quantity equals a second quantity and the second quantity equals a third quantity, then the first equals the third.

With 1 house = if $3+5 = 8$ and $8 = 2 \cdot 4$ then $3+5 = 2 \cdot 4$

With hotel = if $a = b$ and $b = c$ then $a = c$

If a player knows all the properties in math, their rent is doubled on all lots.

Title Deed
Distributive Property

Rent: To multiply a number by a sum, multiply each number inside the parentheses by the number outside the parentheses.

With 1 house = $3(45)$ $120+15$ 135

With hotel = $-7(x+5)$ $-7x-35$ $-7x-35$

If a player knows all the properties in math, their rent is doubled on all lots.

Title Deed
Reflexive

Rent: Any number or expression is equivalent to itself.

With 1 house = $t = t$

With 2 houses = $9 \cdot 6 = 9 \cdot 6$

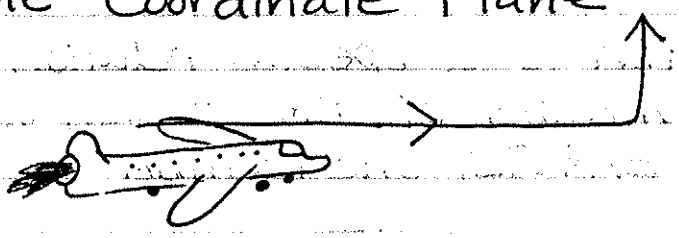
With 3 houses = $if = if$

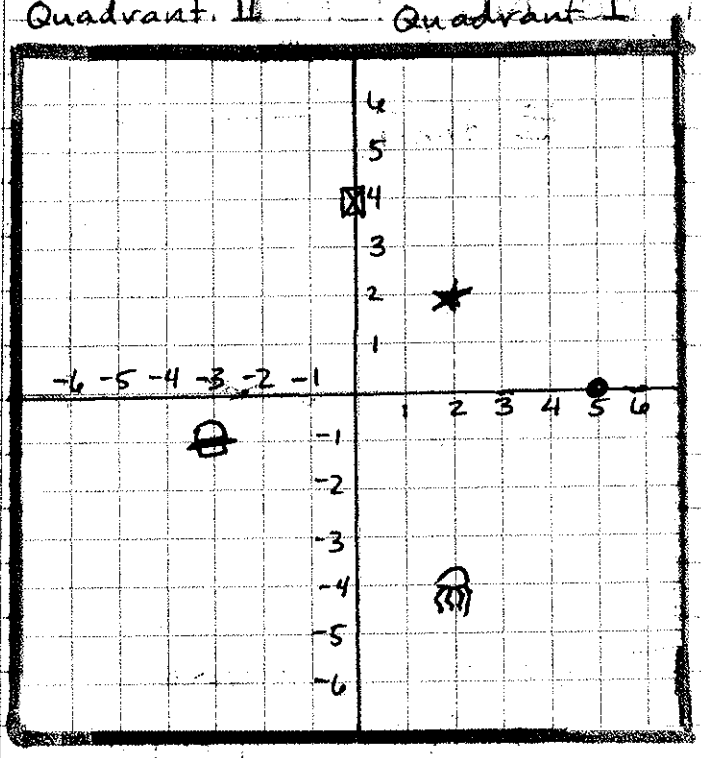
With hotel = $7j = 7j$

If a player knows all the properties in math, their rent is doubled on all lots.

The Coordinate Plane

Mrs. Gross
C3





ordered pair

☆ = (2, 2)
● = (5, 0)
⊠ = (2, -4)
⊖ = (-3, -1)
⊠ = (0, 4)

Things to know!

(x, y)
(domain, range)

The domain for the relation above:

$\{2, 5, 2, -3, 0\}$

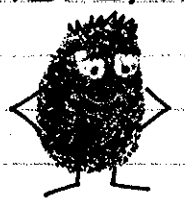
The range for the relation above:

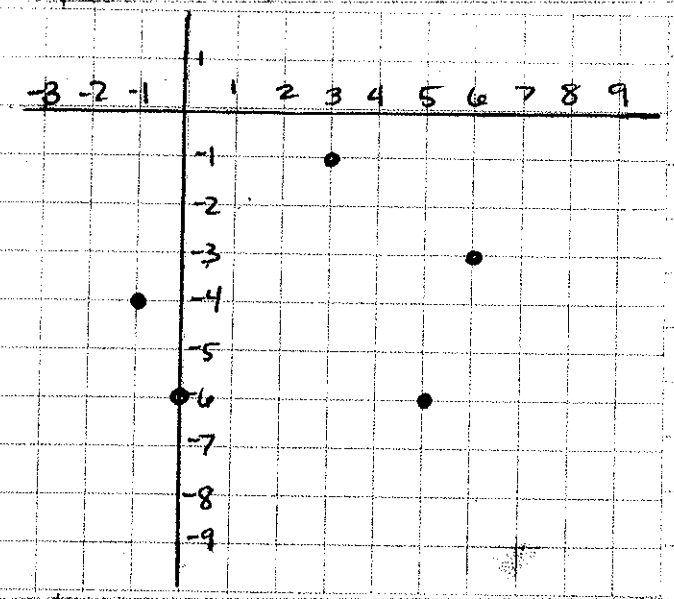
$\{2, 0, -4, -1, 4\}$

* A ~~relation~~ is any set of ordered pairs.

A function is a special relation where each member of the domain is paired with EXACTLY one member in the range.

... There can be NO REPEATS in the X value!





Relation as a table

x	y
-1	-4
0	-6
3	-1
5	-6
6	-3

Relation as a set of ordered pairs

(-1, -4), (0, -6), (3, -1), (5, -6), (6, -3)

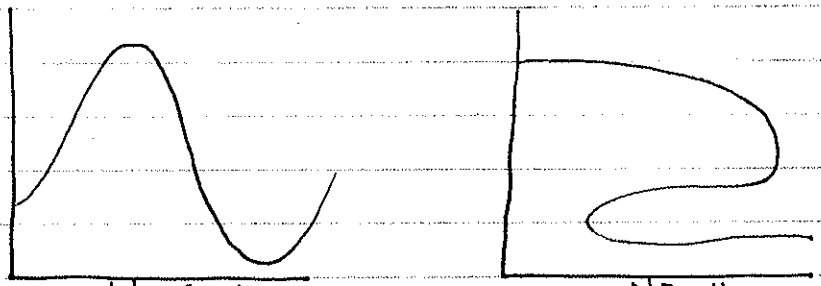
There are no repeats in the X value.

This is a function!

Functions...

Mrs. Ghoss
C3

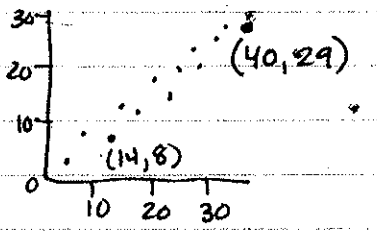
can have only individual x values



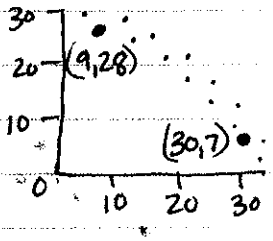
Use your pencil for the "vertical line test" to see if these relations are functions.

The pencil can cross only one line!

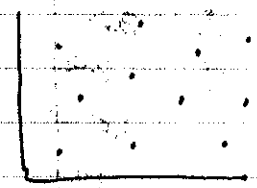
1-6 Scatter Plots - show a relationship between a set of data w/ 2 variables.



as x got larger
y got larger



as x got larger
y got smaller



No Relationship

Positive Relationship Negative Relationship

Would a scatter plot of the data for the following information have a positive, negative, or no relationship?

⊕ ⊖ NR

The size of a household and the amount of the water bill. ⊕

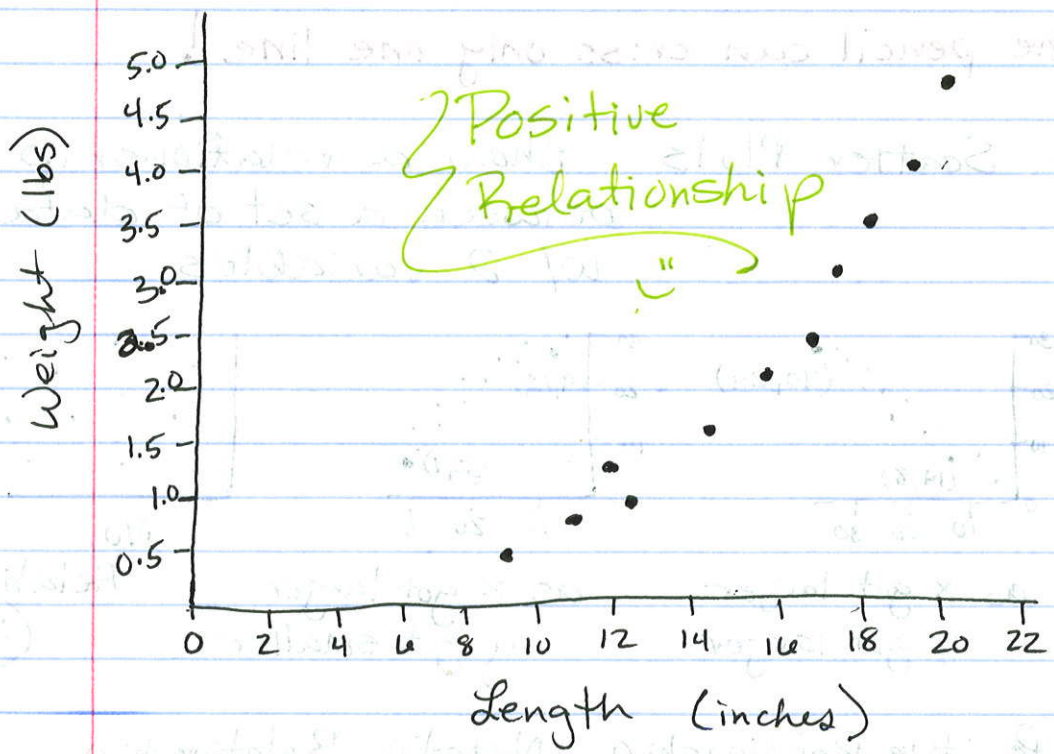
The number of songs on a CD and the cost of the CD. NR

The size of a car's engine and the miles per gallon. ⊖

The speed a plane travels in an hour's time and the distance covered. ⊕

The outside temperature and the amount of the heating bill. ⊖

The size of a television screen and the number of channels it receives. NR



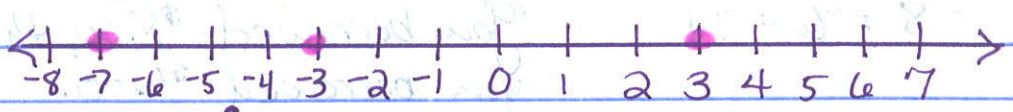
A biologist recorded the lengths and weights of some largemouth bass. The table shows the results.

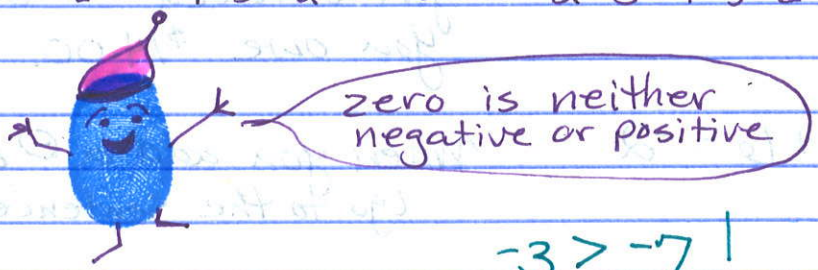
Length (in.)	9.2	10.9	12.3	12.0	14.1	15.5	16.4	16.9	17.7	18.4	19.8
Weight (lb)	0.5	0.8	0.9	1.3	1.7	2.2	2.5	3.2	3.6	4.1	4.8

Integers

Mrs. Gross

$-3 < 3$





$-3 > -7$!

Larger numbers to the right.

A math sentence containing a $>$ or a $<$ is called an **inequality**.

Absolute value is how far the integer is from zero on the number line.

The symbol for absolute value is 2 bars:

$|-5| = 5$ $|5| = 5$

When you add a negative and a positive, you actually subtract and take the integer of the larger absolute!

Change $\ominus$ equations to $\oplus$ equations!

$8 + 6 = 14$ Make your 2nd grade teacher proud!

$-8 + -6 = -14$ you borrowed $8.00, then you borrowed $6.00. You owe $14.00.

$-8 + 6 = -2$ When you add a ⊖ and a ⊕... (go to the sentence)

Flip

$-5 \ominus 4$ $\quad -5 + -4 = -9$

$6 \ominus 10$ $\quad 6 + -10 = -4$

$8 \ominus 2$ $\quad 8 + -2 = 6$

$-10 \ominus 7$ $\quad -10 + 7 = -17$

Plussy + Plussy

$-8 + +7 = -1$

$5 + +2 = 7$

$-10 + +15 = 5$

$6 + +8 = 14$

Multiply + Dividing Integers

COMPLETELY Different RULES

⊕ · ⊕ = ⊕ $\quad$ ■ · ■ = ⊖

⊖ · ⊖ = ⊕ $\quad$ ■ · ■ = ⊖

$-8 \cdot -8 = 64$ $\quad 7 \cdot -6 = -42$

$7 \cdot 6 = 42$ $\quad -8 \cdot 8 = -64$

Same rules for division ☺

Fractions + Decimals

Mrs. Cross

$\frac{7}{10} = 0.7$ $\quad\quad$ $\frac{3}{5} \cdot \frac{2}{2} = \frac{6}{10} = 0.6$

OR...
You can divide

$\frac{7}{8}$ $(7 \div 8) = 0.875$ (terminating decimal)

Terminating decimals end - like $\frac{7}{8} = 0.875$

Repeating decimals do not end. The calculator rounds the answer. You need to be smarter than your calculator!

$\frac{7}{11} = 0.6363363...$ use the repeat bar to show this

$\frac{7}{11} = 0.\overline{63}$

Ordering from least to greatest: $\frac{5}{6}, \frac{4}{5}, \frac{5}{8}$

$\frac{5}{8}$	$\frac{4}{5}$	$\frac{5}{6}$
0.625	0.8	$0.8\overline{3}$

A Rational Number can be written as a fraction!

$13 = \frac{13}{1}$ $\quad -12 = \frac{-12}{1}$ or $\frac{12}{-1}$

$2\frac{1}{4} = \frac{9}{4}$ $\quad -3\frac{1}{8} = -\frac{25}{8}$ or $\frac{25}{-8}$

$3\frac{1}{6} = \frac{19}{6}$

(3 × 6 = 18, then → +1 =)

How to change a repeating decimal into a fraction (11)

$.7 = \frac{7}{10}$ $\quad .\overline{7} = \frac{7}{9}$

Drop the denominator by 1!

$.95 = \frac{95}{100}$ $\quad .\overline{95} = \frac{95}{99}$

This doesn't always work, so you have to check your work w/ a calculator.

Mrs. Gross

Multiplying Rational Numbers

Rational numbers are any numbers that can be written as fractions.

$\frac{3}{2^{4}} \times \frac{2^{1}}{5} = \frac{3}{10}$ *Cross reduce if possible

$5\frac{1}{2} \times \frac{2}{11}$ *Change mixed numbers into improper fractions.

$\frac{11^{1}}{2_{1}} \times \frac{12}{11_{1}}$

*Change Integers into fractions

$-3 \times \frac{-8}{9}$ *Remember your integer rules!

$\frac{-3^{1}}{1} \times \frac{-8}{9_{3}} = \frac{+8}{3} = 2\frac{2}{3}$

$\frac{-1}{4_{1}} \cdot \frac{4^{1}}{9} = \frac{-1}{9}$

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

$\frac{-32}{1_{5}} \cdot \frac{-20^{4}}{9} = \frac{128}{9} \Rightarrow$

$14.\overline{2}$

$14\frac{2}{9}$ ← $14 \cdot 9 = 126$ There are 2 left over!