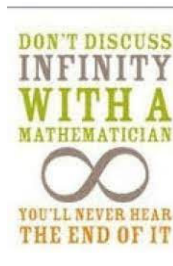


1.1 Integers



Number sets:

- a set of numbers that share certain characteristics
- written in set notation, curly brackets { }, with commas between the numbers
- when sets are infinite we show the pattern and use "... " to show that the pattern continues

Ex. 1 Identify whether the sets are finite or infinite:

- a) {1,2,3,4} *Finite*
- b) {1,2,3,4,...} *Infinite*
- c) $\left\{\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \dots\right\}$ *Inf*
- d) {...,3,2,1} *Inf*
- e) {1,2,3,5,8,13,21} *Finite*
- f) {1,4,9,16,...} *Inf.*

Infinite sets have an undefined number of members...there is no limit to the number of members

Finite sets have a defined, specific number of members in the set

1.1 Integers Blank.notebook

Number Sets in Mathematics

-some commonly used sets of numbers in math are given specific labels (capital letters) to make it easier to refer to

Ex. 2 Match each symbol to the description of the set (which one do you think goes with each?).

(I)

Z

N

W

the set of Integers

these include counting numbers and zero but also include the concept of a "negative"

$\{\dots, -2, -1, 0, 1, 2, 3, \dots\}$

the set of Natural numbers

these are the numbers we first used to count with

$\{1, 2, 3, 4, 5, \dots\}$

the set of Whole numbers

these are counting numbers but also include the concept of a "0"

$\{0, 1, 2, 3, 4, \dots\}$

Operations with Integers

Imagine that you have a cauldron (pot) of liquid.

You can add red squares to the pot which will increase the temperature. (temperature goes up...hotter)

You can add blue squares to the pot which will decrease the temperature. (temperature goes down...colder)

What happens when you add 4 red squares (positive)?

$$+ (+4)$$

$$= +4$$

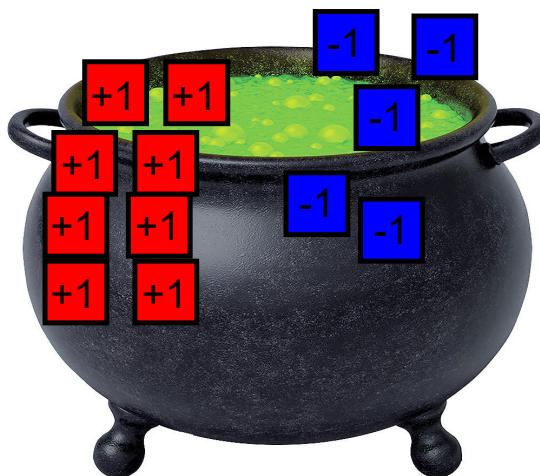
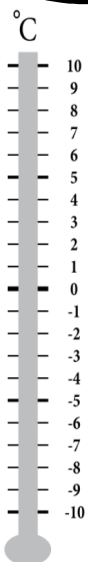
$$= 4$$

ADD
to the pot

What happens when you add 5 blue squares (negative)?

$$+ (-5)$$

$$= -5$$



What happens when you subtract 8 red squares (positive)?

$$- (+8)$$

$$= -8$$

SUBTRACT
from the pot
(take squares out)

What happens when you subtract 3 blue squares (negative)?

$$+ -(-3)$$

$$= +3$$

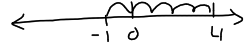
1.1 Integers Blank.notebook

Conclusions...

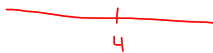
- Adding a negative is the same as subtracting
- Subtracting a negative is the same as adding

Ex. 3

a) $4 + (-5)$
 $= 4 - 5$
 $= -1$



b) $4 - (-5)$
 $= 4 + 5$
 $= 9$



Same sign \Rightarrow positive Diff signs \Rightarrow negative

**If there are TWO SIGNS beside each other...
then SIMPLIFY**

Ex. 4

a) $(-2) + (-3)$
 $= -2 - 3$
 $= -5$

b) $5 + (-7)$
 $= 5 - 7$
 $= -2$

c) $2 - (-5)$
 $= 2 + 5$
 $= 7$

d) $(-3) - (-4)$
 $= -3 + 4$
 $= 1$

e) $4 - 7(-1)$
 $= 4 - 7 + 1$
 $= -3 + 1$
 $= -2$

f) $(-3) - 1$
 ~~$= +3 - 1$~~ \textcircled{C}
 $= 3 - 1$
 $= 2$

Note: Communication \textcircled{C}

- Must have equal signs
- Avoid $--3$
- Always final answer
ex: $(2) \Rightarrow 2$

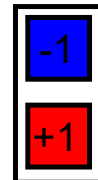
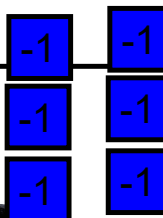
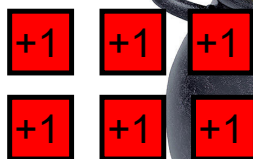
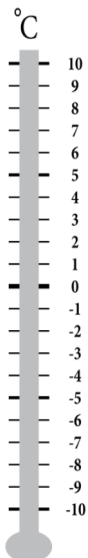
Multiplication of Integers

add 3 groups of 2 red squares

$$\begin{array}{l}
 \text{Same} = +ve \\
 \swarrow \quad \searrow \\
 +3 (+2) \\
 = 6
 \end{array}$$

add 5 groups of 3 blue squares

$$\begin{array}{l}
 \text{Diff} = -ve \\
 \swarrow \quad \searrow \\
 + 5(-3) \\
 = -15
 \end{array}$$



subtract 4 groups of 3 red squares

$$\begin{array}{l}
 \text{Diff} \Rightarrow -ve \\
 \swarrow \quad \searrow \\
 - 4(+3) \\
 = -12
 \end{array}$$

subtract 5 groups of 4 blue squares

$$\begin{array}{l}
 \text{Same} \Rightarrow +ve \\
 \swarrow \quad \searrow \\
 - 5(-4) \\
 = 20
 \end{array}$$

Conclusions

$(+)(+)$

$(-)(-)$

$(+)(-)$

$(-)(+)$

$= +$

$= +$

$= -$

$= -$

When multiplying or dividing integers

- same signs give a Positive answer
- different signs give a Negative answer

1.1 Integers Blank.notebook

Ex. 5 Evaluate.

a) $(2)(-6)$
 $= -12$

b) $-(-4)$
 ~~$= -4$~~ $\textcircled{+4}$
 $= 4$

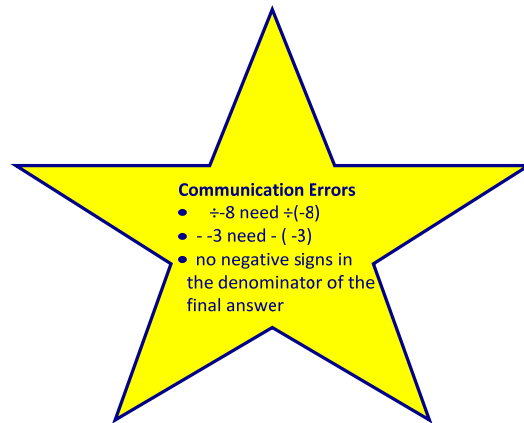
c) $(-24) \div (-8)$
 $= 3$

d) $(-2)(-3)(-4)$
 $= 6(-4)$
 $= -24$

e) $\frac{-36}{-3}$
 $= 12$

f) $0 \div 8$ $\frac{0}{8}$
 $= 0$

g) $12 \div 0$ $\frac{12}{0}$
 $= \text{Undefined!}$



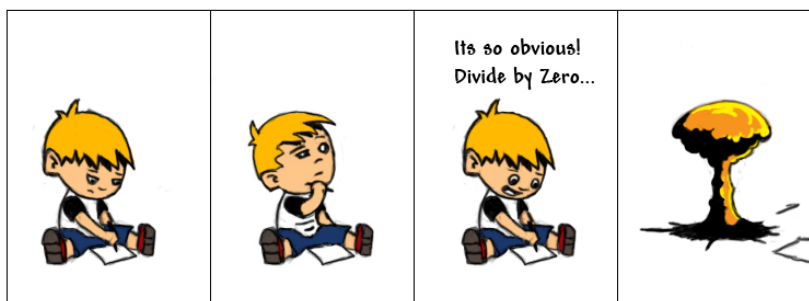
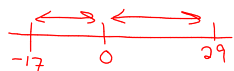
Ex. 6

The average temperature in Ottawa in July is 29°C .

The average temperature in Ottawa in January is -17°C .

Write and evaluate an expression to show the difference between the average temperature in July and January.

Difference = July - January
 $= 29 - (-17)$
 $= 29 + 17$
 $= 46$



Curtis Lawrence