



Algebra 1

UNIT 1 - Interactive Notebook 1-1 The Real Number System

Name:

Date:

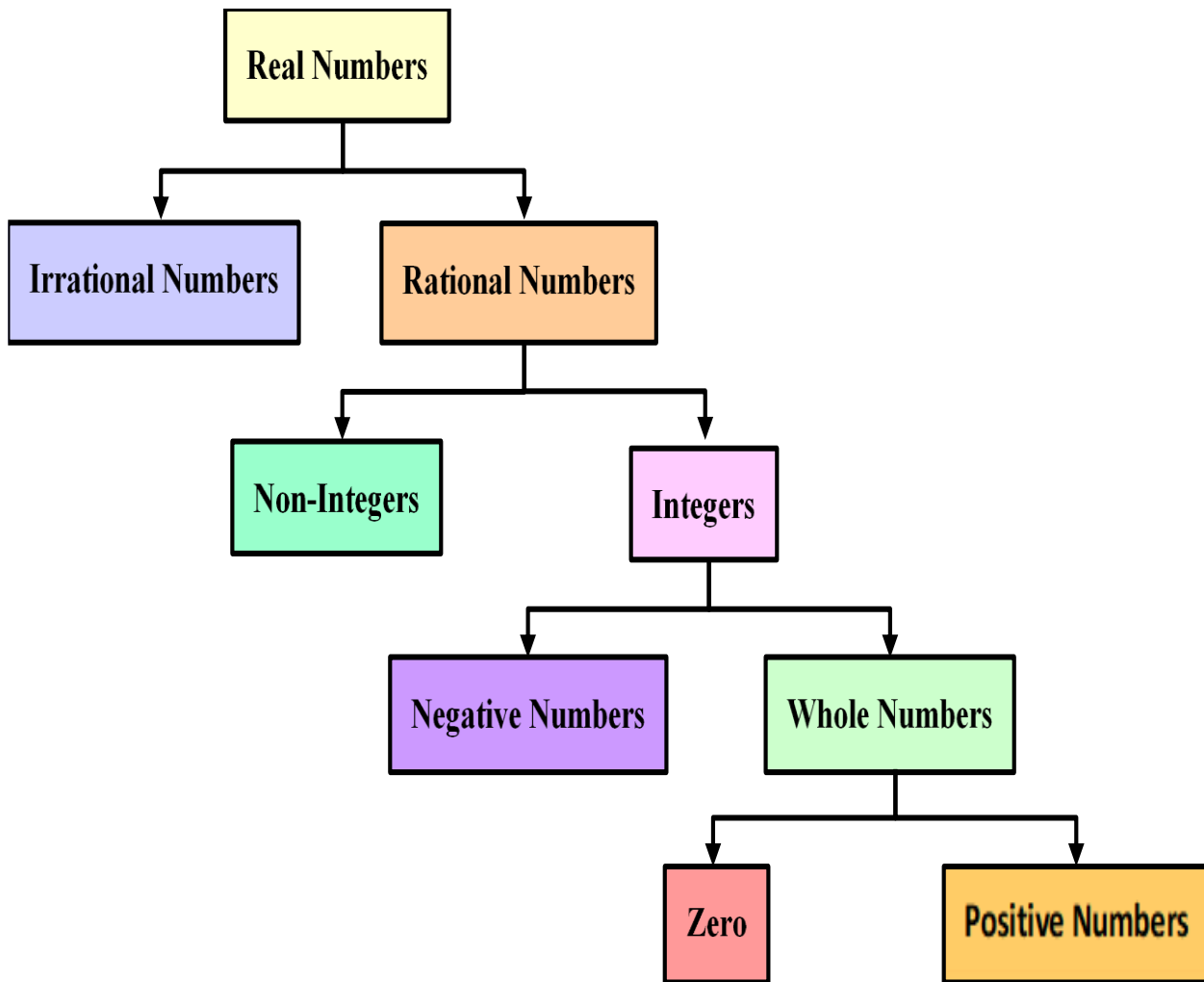
Common Core Standards

[CCSS.MATH.CONTENT.8.NS.A.1](#)

Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.

THE SET OF REAL NUMBERS

The diagram below shows how real numbers are classified.



REAL NUMBERS

Apparently, any number that you can think of are called **REAL NUMBERS**. These are the set of numbers that is formed by combining the **rational numbers** and the **irrational numbers**.

REAL NUMBERS can be **IRRATIONAL** or **RATIONAL**.

IRRATIONAL NUMBERS

Irrational means “**not rational**”. These are the set of all numbers whose decimal representation are neither terminating nor repeating. It cannot be expressed as a quotient of integers. These numbers cannot be expressed as a ratio of two numbers

Examples:

$$\pi, e, \frac{22}{7}, \sqrt{2}, \sqrt{3}, \sqrt{7}$$

RATIONAL NUMBERS

These are the set of all numbers which can be expressed in the form: $\frac{a}{b}$, where **a** and **b** are integers and **b** is not equal to **0**, written as **b ≠ 0**. It can be expressed as **terminating** or **repeating** decimals.

Examples:

$$\frac{3}{4}, \frac{27}{11}, -2, -1, 0, 100, -25, 3.75$$

RATIONAL NUMBERS can be **NON-INTEGERS** or **INTEGERS**.

NON-INTEGERS

These are the set of all numbers that is neither a positive whole number, nor a negative whole number, nor zero. These include **decimals**, **fractions**, and **imaginary numbers**.

Examples:

$$\frac{3}{4}, \frac{27}{11}, 9i, -\frac{1}{2}, -0.25, 1.75, \frac{5}{7}, 3\frac{2}{3}$$

INTEGERS

These are the set of numbers formed by **positive whole numbers**, **negative whole numbers**, and **zero**.

Examples:

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

INTEGERS can be **NEGATIVE** or **WHOLE NUMBERS**.

NEGATIVE INTEGERS

These are whole numbers **less than zero** and usually mean a value that is a deficit or shortage.

Examples:

..., -5, -4, -3, -2, -1

WHOLE NUMBERS

These are the set of numbers formed by adding **0** to the set of **natural numbers** (also called as counting numbers).

Examples:

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, ...

WHOLE NUMBERS include ZERO and POSITIVE INTEGERS.

ZERO

Zero denotes the absence of all magnitude or quantity.

0

POSITIVE INTEGERS

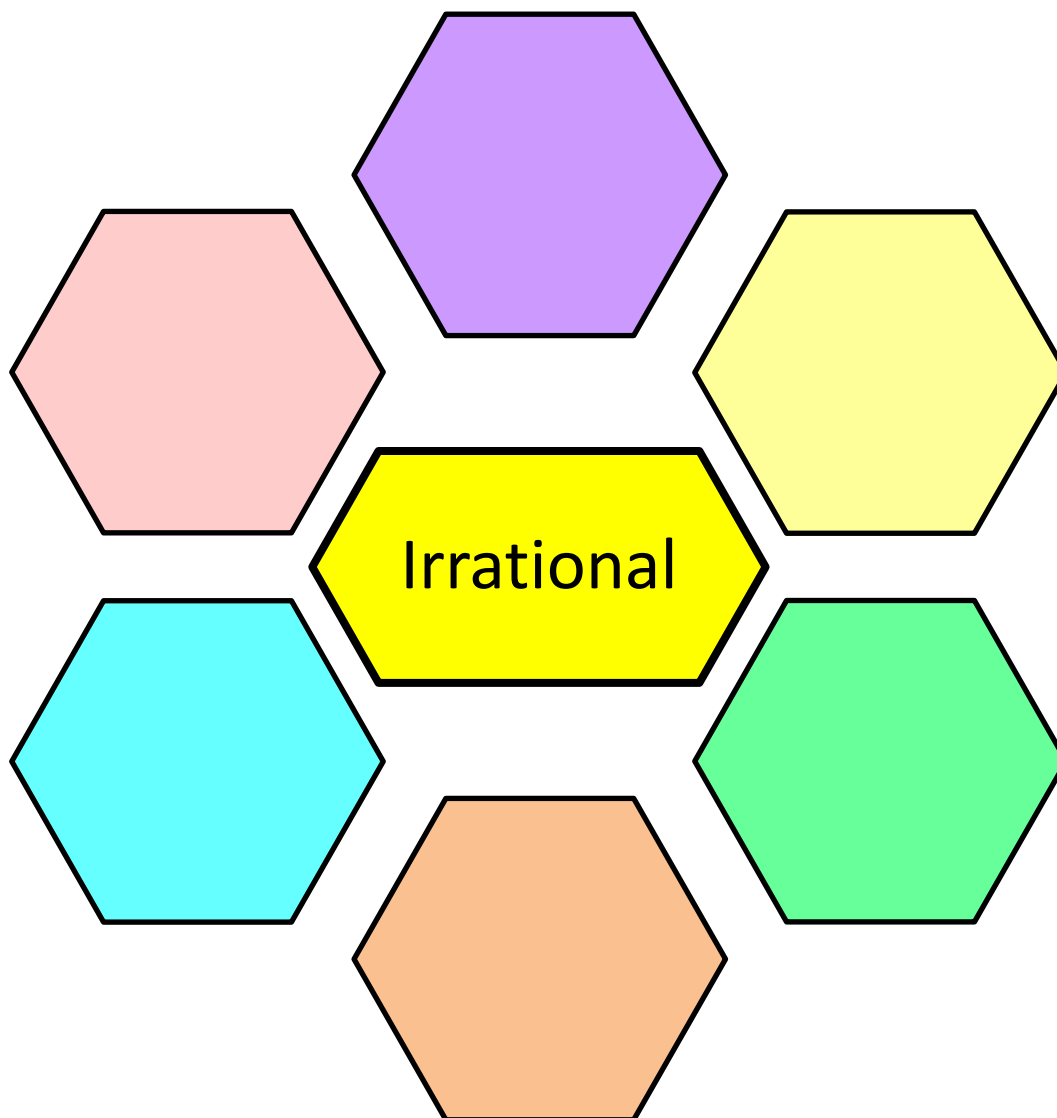
These are the set of numbers that include all **natural numbers** (also known as **counting numbers**)

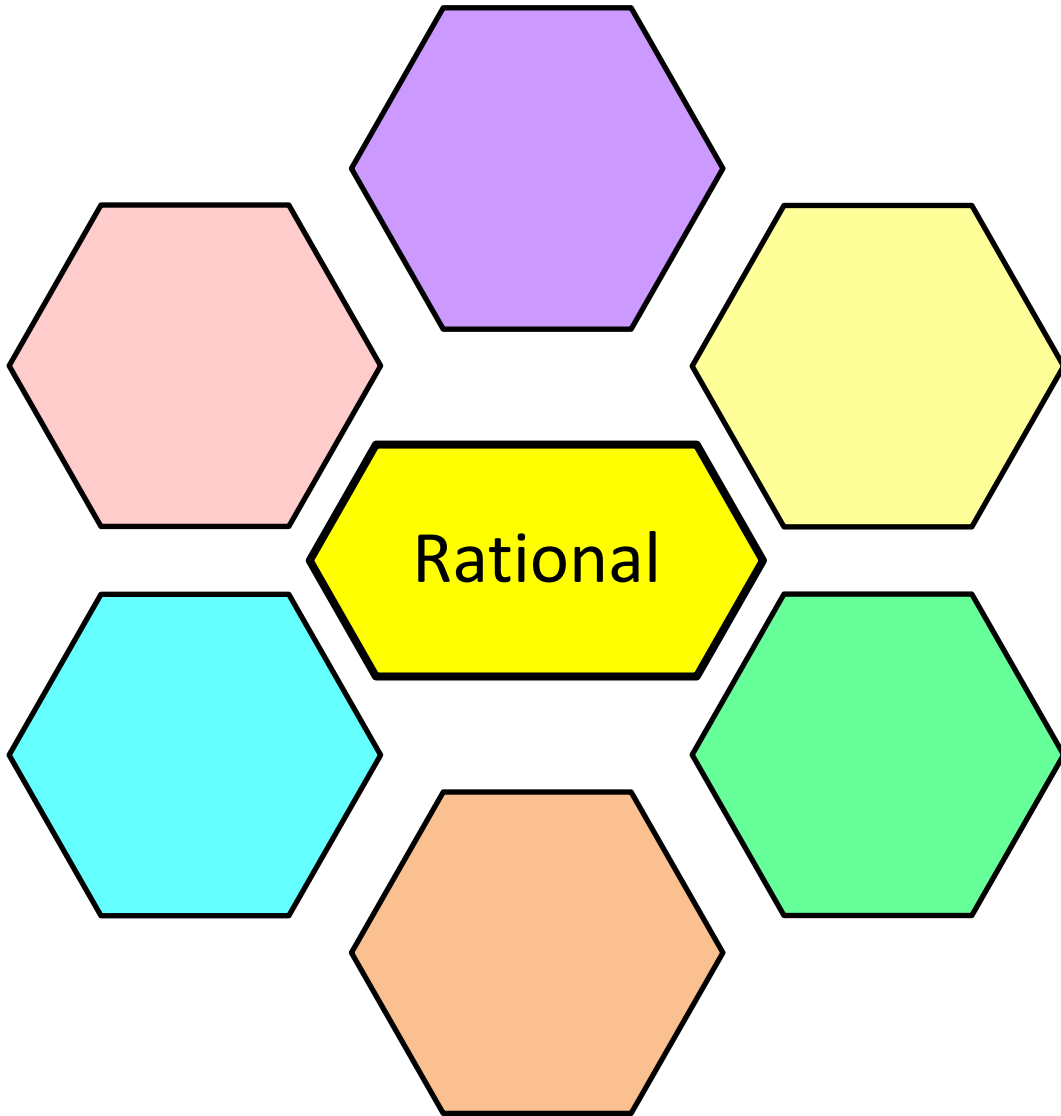
Examples:

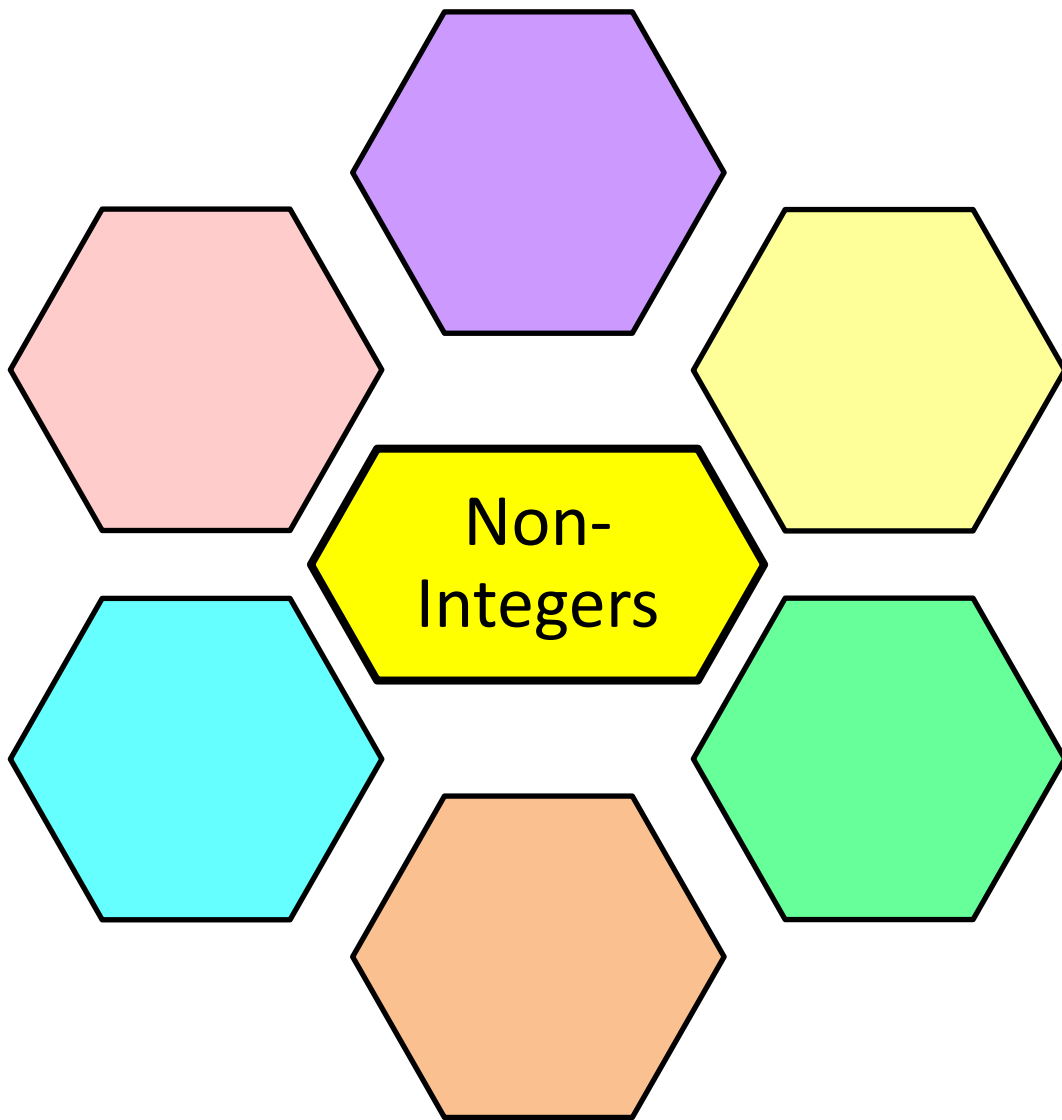
1, 2, 3, 4, 5, 6, 7, 8, ...

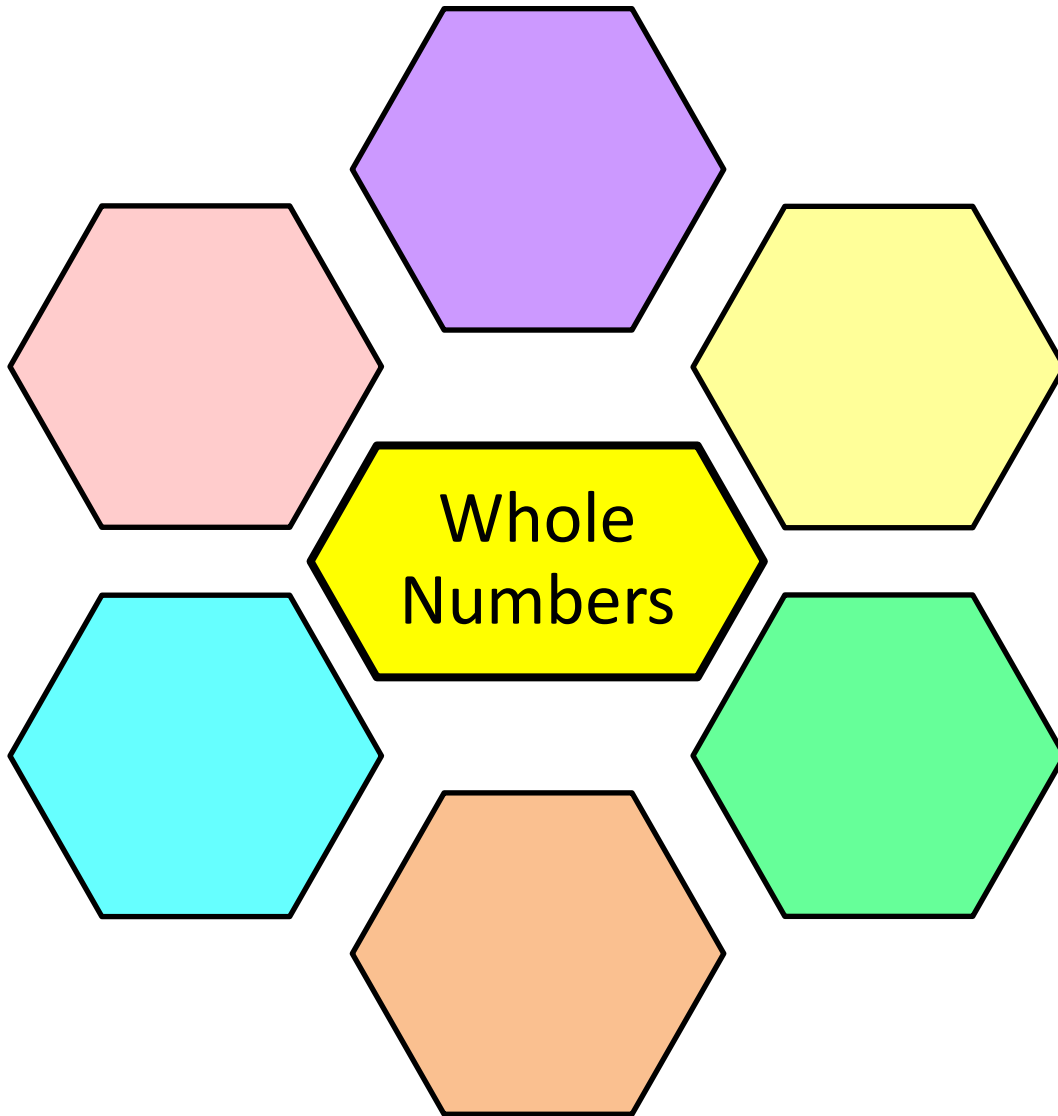
Make it REAL!

Complete the diagram by making your own real number given its classification.







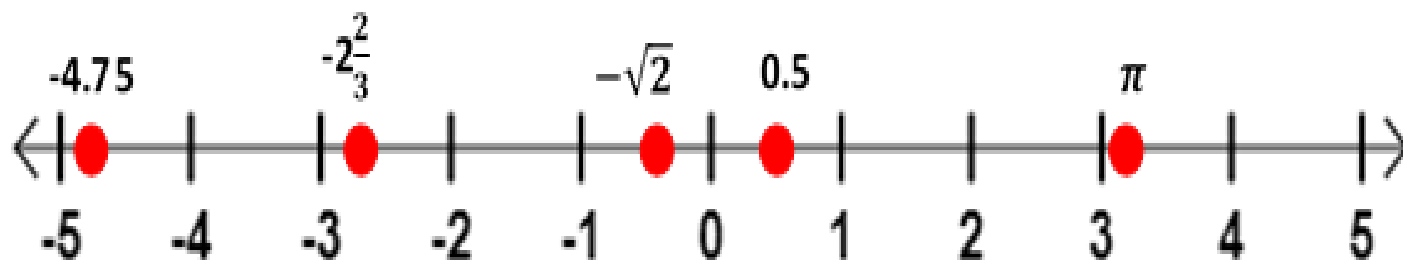


REAL NUMBERS ON THE NUMBER LINE

A **NUMBER LINE** is a straight line with numbers written in equal intervals. It can be used to show the sets of **real numbers** composed of **rational** and **irrational numbers**.

On a **REAL NUMBER LINE**:

- There is a point that corresponds for every real number.
- There is a real number for each point.



OPPOSITES

In Mathematics, on the other hand, OPPOSITES are denoted by the following signs:

Positive Sign $+$

This symbol is written before a number that is positive.

Example: $+7$ is read as “positive 7”

If there no sign before a number, then that number is considered positive.

Example: 7 is understood to be “positive 7”

Negative Sign $-$

This symbol is written before a number that is negative.

Example: -7 is read as “negative 7”

It is very important to write that symbol before a negative number to indicate that it is negative.

Example: -10 is read as “negative 10”

Also, **ZERO IS NEITHER POSITIVE NOR NEGATIVE.**

OPPOSITES ATTRACT!

Represent the following statements with integers.

STATEMENTS	INTEGER
A withdrawal of \$1,000,000	
An increase of 5 degrees in temperature	
Oil leakage of 25 liters	
2 points increase in exam scores	

State the opposite of the of the given statements above and represent with an integer.

STATEMENTS	INTEGER

Task Cards

1.
The value of Pi is a rational number.

True or False

2.
What is the point on the number line three and a half units from the left of zero?

3.
 $-\sqrt{2}$ is an irrational number.

True or False

4.
Represent a weight loss of 7 kilograms with integers.

5.
What is the absolute value of -125?

6.
Where is +9 located on the number line?

7.
The repeating decimal 0.888888... is a rational number.

True or False

8.
Irrational numbers can be found on a number line.

True or False

Answers:

Make It Real!

Students answers may vary.

Opposites Attract!

STATEMENTS	INTEGER
A withdrawal of \$1,000,000	-1,000,000
An increase of 5 degrees in temperature	+5
Oil leakage of 25 liters	-25
2 points increase in exam scores	+2

STATEMENTS	INTEGER
A deposit of \$1,000,000	+1,000,000
A decrease of 5 degrees in temperature	-5
Oil refill of 25 liters	+25
2 points decrease in exam scores	-2

Task Cards

1. FALSE
2. $-3\frac{1}{2}$
3. TRUE
4. -7
5. 125
6. 9 units to the right of zero.
7. TRUE
8. TRUE