



# Understanding Students' Errors

Harita Raval

HBCSE, TIFR

---

[harita@hbcse.tifr.res.in](mailto:harita@hbcse.tifr.res.in)



# Students' Errors

---

- Write at least one error that students make while learning integers.
- Discuss with your neighbour the rationale behind these errors.



# Phases of Error Analysis

---

- Identify :- Knowing the existence of mathematical errors
- Interpret :- Interpreting the underlying rationality of mathematical errors



# Let's Analyze!

---

In a class, a teacher asked students to compare  $-3$  and  $-5$ .

To this, Shristi replied that

$$-3 < -5 \text{ because } 3 < 5.$$

How do you understand Shristi's thinking?



# Integers while Comparing Heights!

---

In a class, a teacher asked students to find the difference between two heights.

T: Find the difference between an elevation(unchai(Hindi) / Uthhan (Marathi)) of 535 feet above sea level and an elevation of 8 feet below sea level.

$$(+535) - (-8) = (-527)$$

$$(-8) - (+535) = (-543)$$

How do you understand the student's thinking?



# Integers while Comparing Heights!

---

T: Find the difference between an elevation(unchai(Hindi) / Uthhan (Marathi)) of 535 feet above sea level and an elevation of 8 feet below sea level.

$$\begin{array}{r} 535 + 8 \\ = 543 \end{array}$$

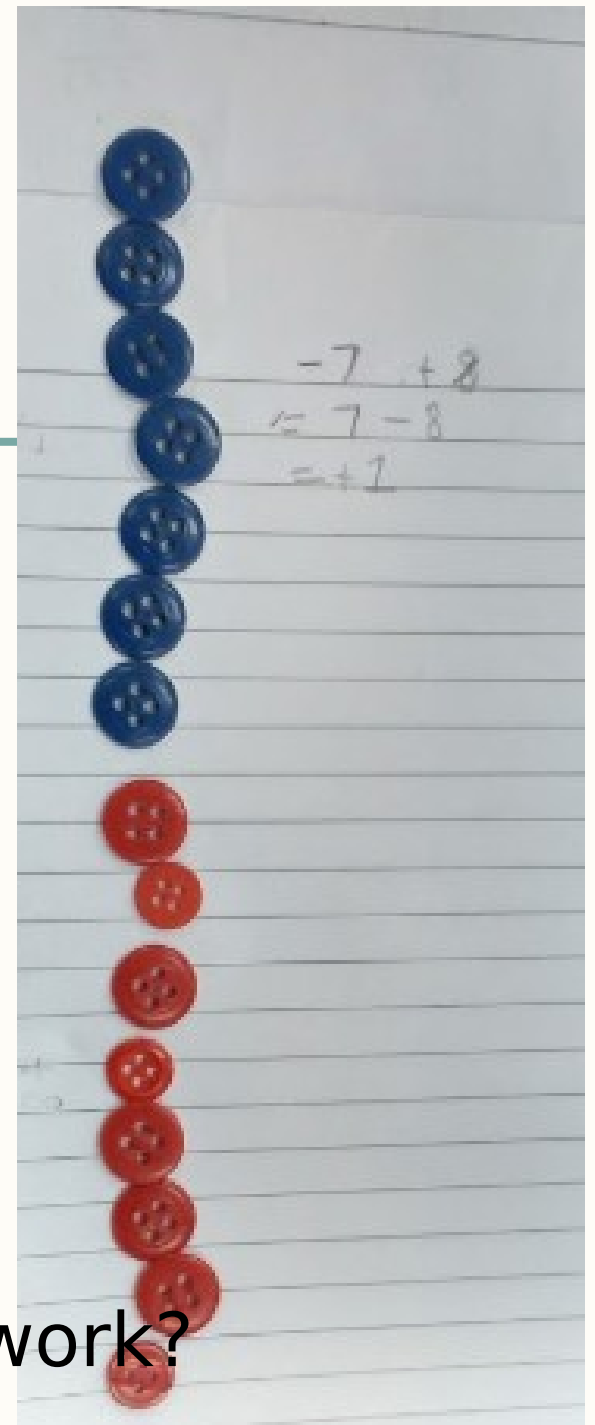
How do you understand the student's thinking?

# Integer with Buttons!

In a class, a teacher played buttons game. The blue buttons stand for negative numbers and red buttons stand for positive numbers.

$$\begin{aligned} & -7 + 8 \\ & = 7 - 8 \\ & = +1 \end{aligned}$$

How do you understand the student's written work?





How do you  
understand the  
student's written  
work?

— Button Game

we have 3 Blue Button = -3  
some more Button = -9  
Blue = -3 + -9 some more  
= 3 + 9  
= -12

The Total = -12

$$\begin{array}{r} -12 + +4 \\ = 12 - 4 \\ = -8 \end{array}$$
$$\begin{array}{r} 12 \\ - 4 \\ \hline 08 \end{array}$$






# Integer Quantities in Temperature

---

A teacher asked students to record different temperatures from different sources. Then she asked them to prepare a chart of difference in those temperatures.

# What do You Notice?



Outside	32.8°C	+33°C	change
Fridge 1	16.2°C	+16°C	-17°C
Fridge 2	4.3°C	+4°C	-12°C
Fridge 2	-15°C	-15°C	+11°C
Outside	32.2°C	+32°C	17°C
Fridge 2	+15°C	+15°C	+17°C
Nimbu papani	27.5°C	+2°C	+13°C



# Integer Quantities in Word Problem!

---

A teacher asked students to write a word problem for the given expression. She gave one example of it and then asked them to make for another.



# What do You Notice?

2.  $(-25) + (-10)$  : A scuba diver jumps off the boat and swims down 25 feet. Then the diver swims down an additional 10 feet. The diver is now 35 feet below the surface of the water.

3.  $(+3) + (-8)$  :

My mother gave 3 rupees and I am owe of 8 RS to my sister now I have to ~~be~~ pay ~~4~~<sup>5</sup> to her to complete my owe with my sister.

How do you understand the student's thinking?



# What do You Notice?

3.  $(+3) + (-8)$ : मे माँ ने मुझे पाँच रुपये दिए और मैंने 8 रुपये खर्च कर दिये।  
फिर उसने : मुझे अभी तो 3 रुपये दिये और पाँच तो  
8 रुपये दिये और फिर मैंने 8 रुपये खर्च कर दिये।

3.  $(+3) + (-8)$ : My mother gave me 3 rupees. I gave two my friend  
because I have taken by him. now I gave him 3 rupees. now 5  
rupees I have to pay.

How do you understand the student's thinking?

# Integer Meanings!

Integers as a state

Integers as a change

Integers as a relation between numbers and quantities





Thank You!

---