CHALLENGE

A TIMED challenge question begins on the next screen.

The Rules:

Shout out your answer.

The first person to solve the problem correctly is the winner of the challenge.

You will have only 30 seconds.

CHALLENGE

Add the first 100 positive integers.

which means add:

1 + 2 + 3 + 4 + 5 + ... + 96 + 97 + 98 + 99 + 100

BEATEN BY A SEVEN-YEAR OLD

At the age of seven, the man to the left added the integers from 1 to 100 in under 30 seconds.

He later became one of the greatest mathematicians that ever lived.

Carl Friedrich Gauss
1777-1855

$$1 + 2 + 3 + 4 + 5 + ... + 96 + 97 + 98 + 99 + 100$$
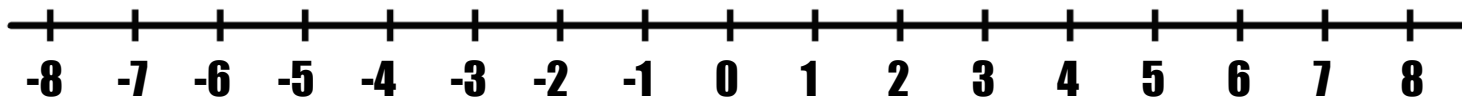
$1 + 100 = 101$

$2 + 99 = 101$

$3 + 98 = 101$

There are 50 pairs of 101.

$101 \cdot 50 = \boxed{5050}$

ADDING ON THE NUMBER LINE

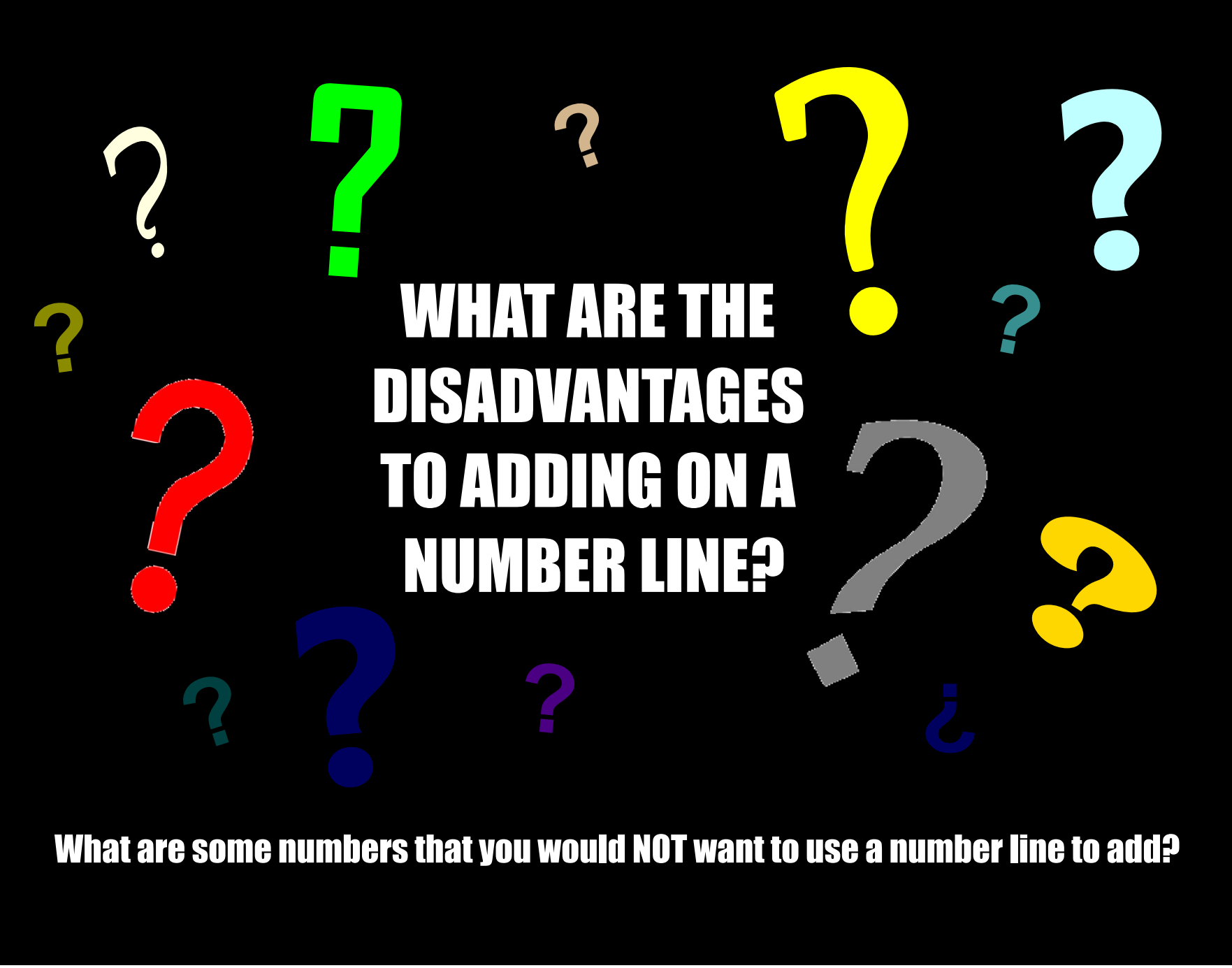**LEFT = NEGATIVE DIRECTION** **RIGHT = POSITIVE DIRECTION**

←————————————————————————→

-8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8

START AT -3   **LEFT 4**

ex1) $-3 + (-4) = -7$

START AT -5   **RIGHT 8**

ex2) $-5 + 8 = 3$

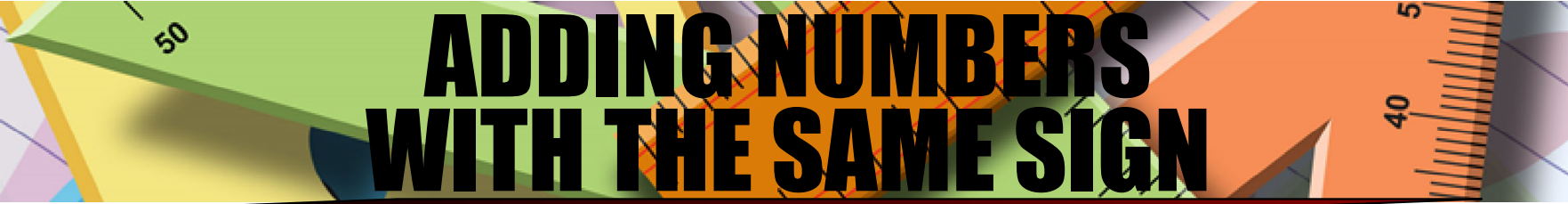**START AT 5**   **LEFT 8**   **LEFT 2**   **RIGHT 7**

ex3) $5 + (-8) + (-2) + 7 = 2$

WHAT ARE THE DISADVANTAGES TO ADDING ON A NUMBER LINE?

What are some numbers that you would NOT want to use a number line to add?

ADDING NUMBERS WITH THE SAME SIGN

Numbers that are too large and fractions would be difficult to add on a number line.

ADDING NUMBERS WITH SAME SIGN

1. Add the digits together - ignoring the signs.

2. Keep the sign of the digits for your answer.

ADDING NUMBERS WITH THE SAME SIGN

ex4) -10 + (-20)

$$= \boxed{-30}$$

ex5) 12 + 33

$$= \boxed{45}$$

ex6) -100 + (-600)

$$= \boxed{-700}$$

ex7) -3000 + (-8000)

$$= \boxed{-11000}$$

ADDING NUMBERS WITH DIFFERENT SIGNS

Large numbers and fractions would be difficult to add on a number line.

ADDING NUMBERS WITH DIFFERENT SIGNS

1. Subtract the digits - ignoring the signs.

2. Keep the sign of the larger digit for your answer.

ADDING NUMBERS WITH DIFFERENT SIGNS

ex8) **10 + (-17)**

$$= \boxed{-7}$$

ex9) **-10 + 17**

$$= \boxed{7}$$

ex10) $-\dfrac{3}{4} + \dfrac{7}{2} \cdot \dfrac{2}{2}$ We need a common denominator.

$$\dfrac{-3}{4} + \dfrac{14}{4} = \boxed{\dfrac{11}{4}}$$

It is fine to leave our answers as reduced improper fractions.

ex11) $-4 + 12 + (-10) + 2$

$$= 8 + (-10) + 2$$

$$= -2 + 2$$

$$= \boxed{0}$$

When adding more than two numbers when some are positive and some are negative, you can add the positive and negative numbers separately, then add the 2 sums. Or you can add the numbers in the order in which they occur.

THE DEFINITION OF SUBTRACTION

One way to handle a subtraction problem is to change it into an addition problem, and then use the rules for adding signed numbers.

DEFINITION OF SUBTRACTION

For all real numbers a and b:

$$a - b = a + (-b)$$

In other words, we can think of subtraction as "adding the opposite."

SUBTRACTING REAL NUMBERS

ex12) **3 - 9**

$= 3 + (-9)$

$= \boxed{-6}$

ex13) **-3 - 9**

$= -3 + (-9)$

$= \boxed{-12}$

ex14) **-20 - 17**

$= -20 + (-17)$

$= \boxed{-37}$

ex15) **-6 - 8 - 4**

$= -6 + (-8) + (-4)$

$= \boxed{-18}$

DOUBLE SIGNS

Double signs are easy to take care of. Double negatives should be changed immediately when they come up in a problem.

$+$ $-$ means $-$

$-$ $-$ means $+$

7 + (-4) = ③
7 - 4

7 - (-4) = ⑪
7 + 4

DOUBLE SIGNS

ex16) 15 - (-30)

$$= 15 + (+30)$$

$$= 15 + 30$$

$$= \boxed{45}$$

ex17) -10 - (-6)

$$= -10 + (+6)$$

$$= -10 + 6$$

$$= \boxed{-4}$$