

Girls' Adventures in Math 2019

Round 2, Division 3-5

An “**upside-downie number**” is a number that is a valid number when rotated to be upside down.

For example, 8961 is an **upside-downie number** because when we turn it upside down, we get 1968.

$$8961 \xrightarrow{\text{rotate}} 1968 \checkmark$$

However, 25 is not an **upside-downie number** because neither 2 nor 5 is a number when turned upside down.

$$25 \xrightarrow{\text{rotate}} 52 \times$$

180 is also not an **upside-downie number** because a three digit number cannot start with 0.

$$180 \xrightarrow{\text{rotate}} 081 \times$$

An “**upside-downie expression**” is a mathematical expression written using **upside-downie numbers** that equals itself when turned upside down.

For example, $8+1$ is an **upside-downie expression** because when turned upside down, it is also equal to 9.

$$8+1 \xrightarrow{\text{rotate}} 1+8$$
$$=9 \qquad =9 \checkmark$$

However, $8-6$ is not an **upside-downie expression** because it evaluates to a different number upside down.

$$8-6 \xrightarrow{\text{rotate}} 9-8$$
$$=2 \qquad =1 \times$$

TEAM CODE:

SCHOOL:

Part 1: Which three of the expressions below are upside-downie expressions?

A. $22 - 22$

B. $91 - 16$

C. $90 + 06$

D. $11 + 66$

E. $811 - 188$

F. $101 + 181$

G. $11 + 8$

H. 66×11

Answer: The upside-downie expressions listed above are , , and .

Part 2: Find an upside-downie expression using positive integers that evaluates to the following results.

$121 =$ \times

$16 =$ $+$

$77 =$ $+$

$3 =$ $-$

Part 3: Find an upside-downie expression using positive integers that evaluates to the following results.

$968 =$ \times

$42 =$ $-$

$352 =$ $+$