#### Warmup 2/ (# of characters in "Valentine's Day") Created by Mr. Lischwe INSIDE YOUR DESK SHOULD BE:

- No regular whiteboards
- **ONE Graphing Sheet**
- ONE Marker/ONE Eraser (PUT EXTRAS BACK)

By moving just ONE matchstick, create a true equation! There are three separate methods that can work. Can you find them all? (None of the methods involve creating a sign!)





# р. 457 (I – 7, 9)

▲ ABC with vertices A(1, 2), B(3, 1), and C(3, 4) translated 2 units left and 1 unit up

A'(-1, 3), B'(1, 2), C'(1, 5)



2. rectangle JKLM with vertices J(-3, 2), K(3, 5), L(4, 3), and M(-2, 0) translated 1 unit right and 4 units down

J'(-2, -2), K'(4, 1), L'(5, -1), M'(-1, -4)



Triangle PQR has vertices P(0, 0), Q(5, -2), and R(-3, 6). Find the vertices of P'Q'R' after each translation. (Example 2)

- **3.** 6 units right and 5 units up *P*′(6, 5), *Q*′(11, 3), *R*′(3, 11)
- 4. 8 units left and 1 unit down P'(-8, -1), Q'(-3, -3), R'(-11, 5)

#### Use the image of the race car at the right. (Example 3)

- 5. Use translation notation to describe the translation from point A to point B. (x 3, y 3)
- 6. Use translation notation to describe the translation from point *B* to point *C*. (x 2, y 4)



Quadrilateral KLMN has vertices K(-2, -2), L(1, 1), M(0, 4), and N(-3, 5). It is first translated by (x + 2, y - 1) and then translated by (x - 3, y + 4). When a figure is translated twice, a double prime symbol is used. Find the coordinates of quadrilateral K"L"M"N" after both translations.

*K*<sup>"</sup>(-3, 1), *L*<sup>"</sup>(0, 4), *M*<sup>"</sup>(-1, 7), *N*<sup>"</sup>(-4, 8)

9. 
 Preason Inductively A figure is translated by (x − 5, y + 7), then by (x + 5, y − 7). Without graphing, what is the final position of the figure? Explain your reasoning to a classmate. the same as the original position of the figure; Sample answer: Since −5 and 5 are opposites, and −7 and 7 are opposites, the translations cancel each other out.

# What kind of transformation is this? (x – 2, y + 4)

#### A translation of 2 units left and 4 units up

I. The preimage points are (-2, 3) and (1, 3) and the image points are (-6, 6) and (-3, 6). Describe the translation in words. (Which directions? How far?)

• (You can use your graphing sheet to help, but if you can figure it out without it, go for it)

2. Write the translation from #1 in <u>coordinate notation</u>.



- What was the translation? Write it in coordinate notation.
- (x, y + 4)

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#### Transformations

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#### Today's Objectives:

Reflect figures across the x- and y-axis on a coordinate plane

# How can we **draw** a reflection?

**VOLUNTEER** to come up to the board and draw the image of the triangle? You may use any tools you would like to help you be as exact as you can.







\*\*\*TURN YOUR PAPER SO THE LINE OF REFLECTION IS STRAIGHT UP AND DOWN!!!\*\*\*

 It will be <u>much</u> easier to see how the reflection will go.



- Draw a triangle with vertices F (4, 1), B (4, 5), and I (6, 1).
- **REFLECT**  $\Delta FBI$  over the x-axis.
- YOUR NEW COORDINATES SHOULD BE: F'(4,-1); B'(4,-5); I'(6,-1)



- Erase your image, but keep the original triangle:
   F (4, 1), B (4, 5), and I (6, 1).
- Now reflect  $\Delta FBI$  over the y-axis.
- YOUR NEW COORDINATES SHOULD BE:
   F'(-4, 1); B'(-4, 5); I'(-6, 1)





# **Reflection Strategy**

• Count spaces from each vertex to the line of reflection, then count the same number of spaces on the other side



### Do not reflect over the wrong axis. (This is a VERY common mistake)

One helpful strategy is to trace a line over the axis. This will be a visual reminder of which axis to use.

- Draw parallelogram MATH: M(-5, 5); A(-6, 7);
   T(-1, 5); H(-2, 7)
- First reflect the parallelogram over the xaxis, then reflect the image of that over the y-axis.
- YOUR NEW COORDINATES SHOULD BE: M"(5, -5); A"(6, -7); T"(1, -5); H"(2, -7)





- Draw Δ*FUN*: F(3, 4); U(5, -2); N(7, 4)
- Reflect the triangle over the x-axis.
- YOUR NEW COORDINATES SHOULD BE: F'(3, -4); U'(5, 2); N'(7, -4)





## Homework

• p.465 (1 – 7), p. 468 (20, 21)