DIÁZ

STATION 1: Parallel and Perpendicular Lines

Writing equations of lines that are parallel and perpendicular

1) Given an equation $y = -3x + 4$, write an equation perpendicular to this equation going through the point (6, 7)

$x \quad y$

$m_{\perp} = \frac{1}{3}$

$7 = \frac{1}{3}(6) + b$

$7 = 2 + b$

$5 = b$

$y_{\perp} = \frac{1}{3}x + 5$

2) Given an equation $y = \frac{1}{2}x + 9$, write an equation parallel to this equation going through the point (8, 11)

$x \quad y$

$m_{\parallel} = \frac{1}{2}$

$11 = \frac{1}{2}(8) + b$

$11 = 4 + b$

$7 = b$

$y_{\parallel} = \frac{1}{2}x + 7$

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STATION 2: Midpoint and Distance Formula

1) Plot and label these points: J (-6, 2)   K (4, 2)   L (-1, 7)   M (-1, 2)

2) Form line segments JK, JL and KL by connecting points J, K, and L

3) Use the **distance formula** to find the lengths of the following line segments:

JK $\underline{10}$ JL $\underline{\sqrt{50} = 5\sqrt{2}}$ KL $\underline{\sqrt{50} = 5\sqrt{2}}$

JM $\underline{5}$ MK $\underline{5}$

4) Calculate **the midpoint** of line segment JK
   a. Midpoint of segment JK = $\underline{(-1, 2)\ (M)}$

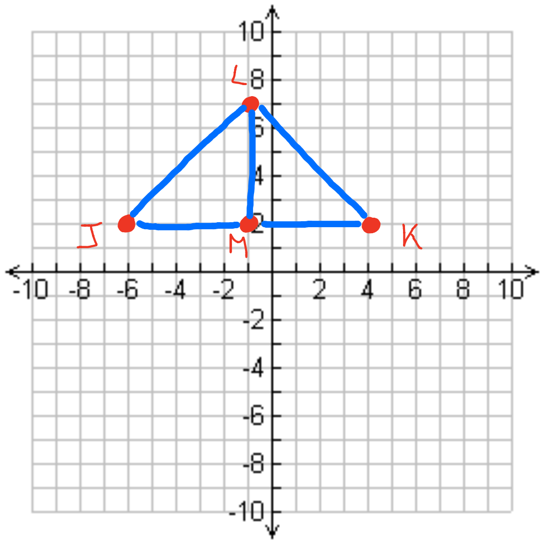
Conclusion Questions:

- Do you notice anything interesting about the lengths of segments JL and KL?

they are congruent

- What is special about the point M?

Point M is the midpoint of JK



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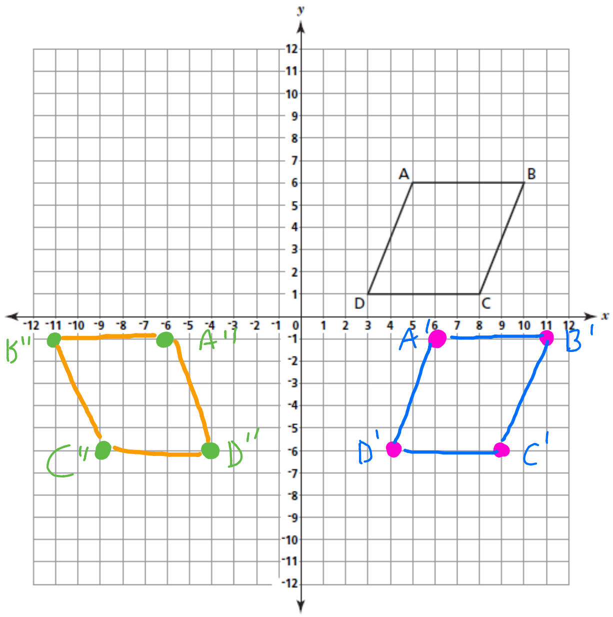
STATION 3: Rotation, Translation and Reflection

Quadrilateral *ABCD* is plotted on the grid below.



1) Translate the quadrilateral *ABCD*, (x + 1, y – 7) and label it *A'B'C'D'*

2) Write the new coordinates of *A'B'C'D'* below

A': (6, -1) *B'*: (11, -1)

C': (4, -6) *D'*: (9, -6)

3) Reflect quadrilateral *A'B'C'D'* **over the y-axis** and label it *A"B"C"D"*

4) Write the new coordinates of *A"B"C"D"* below

A'': (-6, -1) *B''*: (-11, -1) *C''*: (-9, -6) *D''*: (-4, -6)

5) Rotate the quadrilateral *ABCD* **270° clockwise** and label it *A'''B'''C'''D'''*

6) Write the new coordinates of *A'''B'''C'''D'''* below

A''':______ *B'''*:_______ *C'''*:_______ *D'''*:_______

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STATION 4: Dilations

Rule: $(x, y) \rightarrow (fx, fy)$ where *f* represents the scale factor. This can also be represented as D_f

1.If the scale factor is 3, how would you write the rule?

$(x, y) \rightarrow (3x, 3y)$

2. Triangle *ABC* has vertices *A* (0, 2), *B* (4, 4), and *C* (-1, 4). What are the vertices of its *image* with D_4?

Scale Factor: 4

New Vertices:

A': (0, 8) B': (16, 16) C (-4, 16)

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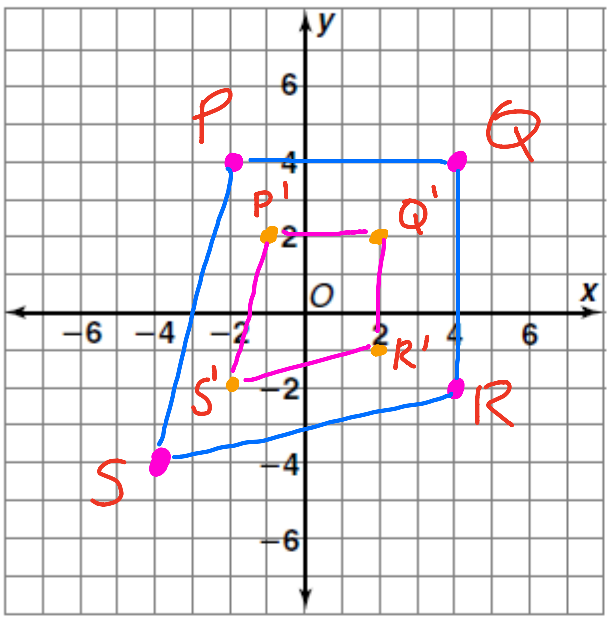
3. Quadrilateral *PQRS* has vertices *P* (-2, 4), *Q* (4, 4), *R* (4, -2), and *S* (- 4, - 4). The dilation is $D_{\frac{1}{2}}$.

a) Draw Quadrilateral *PQRS*



b) What is the scale factor?

$\frac{1}{2}$

c) What are the coordinates of the image?

P': (-1, 2) Q': (2, 2)
R': (2, -1) S': (-2, -2)

d) Graph the new quadrilateral *P'Q'R'S*

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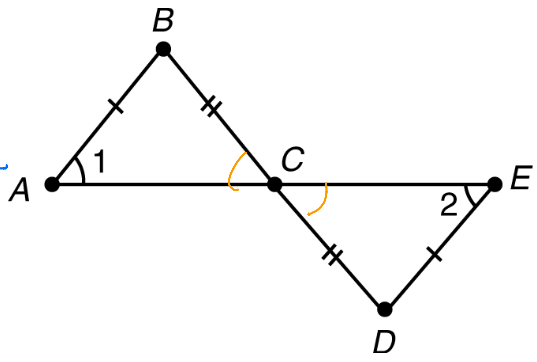
STATION 5: Proofs

1) Write a two-column proof:

Given: $\angle 1 \cong \angle 2$, $\overline{AB} \cong \overline{DE}$, $\overline{BC} \cong \overline{CD}$,



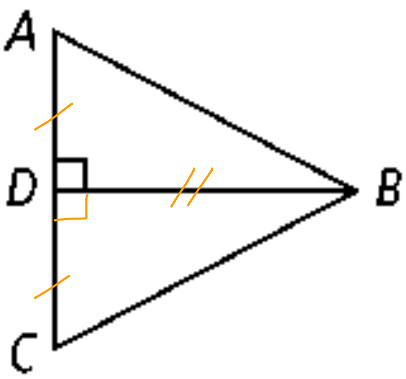
Prove: $\overline{AC} \cong \overline{CE}$

Statement	Reason
① $\angle 1 \cong \angle 2$, $\overline{AB} \cong \overline{DE}$, $\overline{BC} \cong \overline{CD}$	① Given
② $\angle BCA \cong \angle DCE$	② Vertical angles
③ $\triangle ABC \cong \triangle EDC$	③ AAS $\cong$
④ $\overline{AC} \cong \overline{CE}$	④ Def of $\cong$ $\triangle$'s

2) Write a proof for the following:

Given: $\overline{BD} \perp \overline{AC}$, D is the midpoint of $\overline{AC}$.

Prove: $\overline{BC} \cong \overline{BA}$



Statement	Reason
① $\overline{BD} \perp \overline{AC}$, D is Midpoint of $\overline{AC}$	① Given
② $\overline{AD} \cong \overline{CD}$	② Def of midpoint
③ $\overline{DB} \cong \overline{BD}$	③ Reflexive prop of $\cong$
④ $\triangle ABD \cong \triangle CBD$	④ SAS $\cong$
⑤ $\overline{BC} \cong \overline{BA}$	⑤ Def of $\cong$ $\triangle$'s