Winston
Geometry

1.8 Dilations with a Center at the Origin → Dilate around (0,0).

Dilations Versus Stretches Versus Shrinks

- A dilation affects BOTH the x and the y value.
- A horizontal stretch or shrink affects only the x.
- A vertical stretch or a shrink affects only the y.
- A stretch is when you multiply the x or the y value by a number greater than 1.
- A shrink is when you multiply the x or the y value by a number $0 < \# < 1$ (greater than 0, less than 1).

K = Scale Factor

Rules

Dilation: $(x,y) \rightarrow '(kx, ky)$

Horizontal stretch or shrink: $(x,y) \rightarrow '(kx, y)$

Vertical stretch or shrink: $(x,y) \rightarrow '(x, ky)$

1) Dilate by a scale factor of ½.

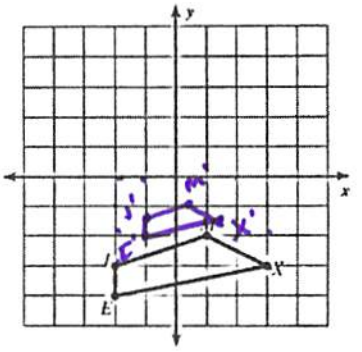
$(x,y) \rightarrow '(\frac{1}{2}x, \frac{1}{2}y)$

$J(-2,-3) \rightarrow J'(-1,-1.5)$

$E(-2,-4) \rightarrow E'(-1,-2)$

$M(1,-2) \rightarrow M'(\frac{1}{2},-1)$

$N(3,-3) \rightarrow N'(1.5,-1.5)$



2) What is the rule that represents this transformation?

$(x,y) \rightarrow '(\frac{1}{2}x, \frac{1}{2}y)$ OR $'(\frac{x}{2}, \frac{y}{2})$

3) If A(3, 5) & B(3, 9) is dilated by a scale factor of 3, what are the coordinates of the image?

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

*multiply x & y by 3.

$A(3,5) \rightarrow A'(9,5)$

$B(3,9) \rightarrow B'(9,27)$

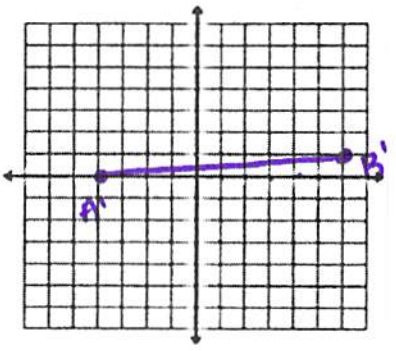
4) If $\overline{AB}$ is horizontally stretched by a scale factor of 2. If A(–2, 0) and B(3, 1), graph the image.

$(x,y) \rightarrow (2x, y)$

*mult. x by 2.

$A(-2,0) \rightarrow A'(-4,0)$

$B(3,1) \rightarrow B'(6,1)$



5) What rule represents this transformation?

$(x,y) \rightarrow '(2x, y)$

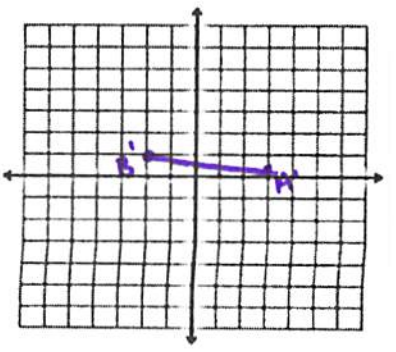
6) If $\overline{AB}$ is vertically shrunk by a scale factor of $\frac{1}{3}$. If A(3, 1) and B(–2, 3), graph the image.

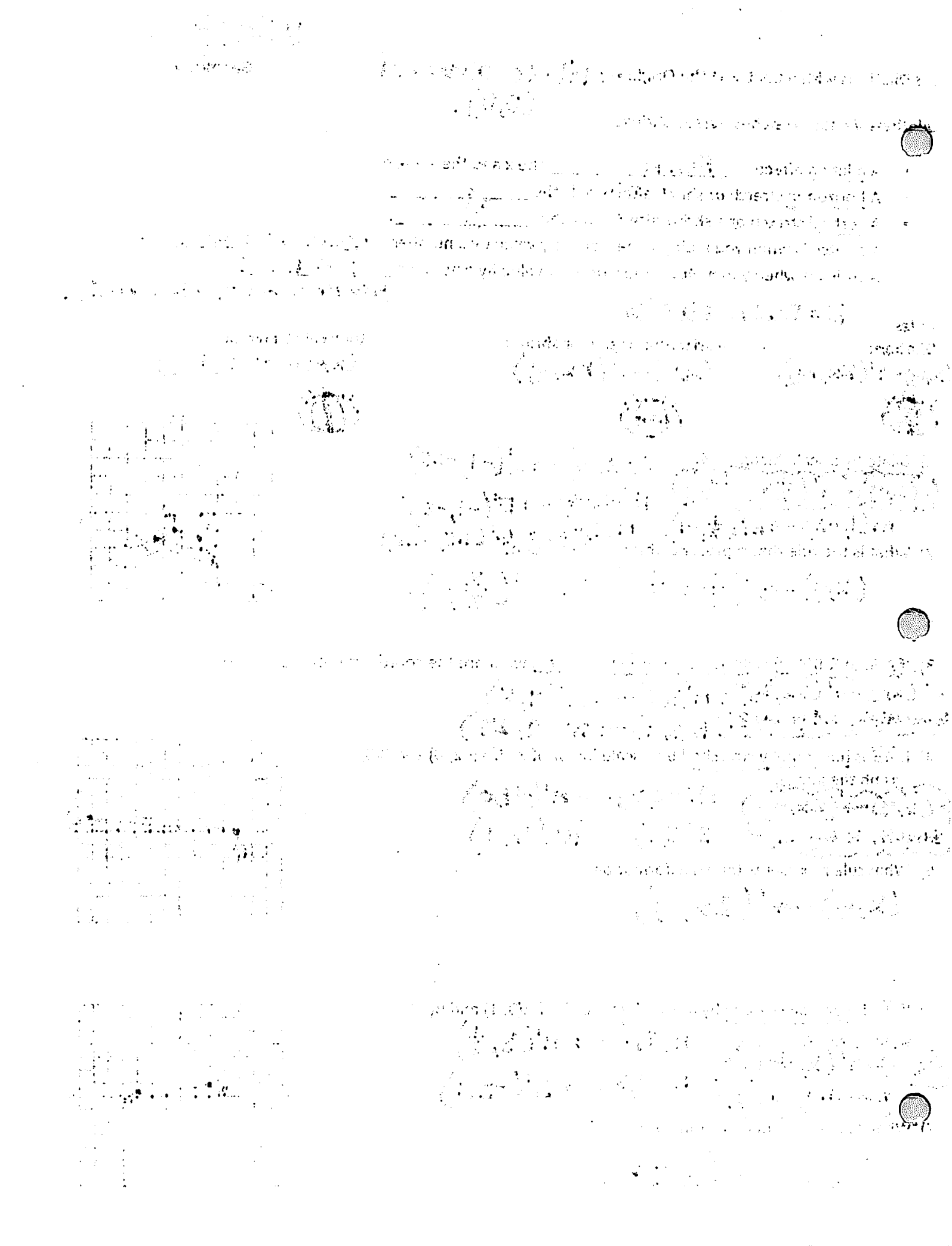
$(x,y) \rightarrow '(x, \frac{1}{3}y)$

*mult. y by $\frac{1}{3}$.

$A(3,1) \rightarrow A'(3, \frac{1}{3})$

$B(-2,3) \rightarrow B'(-2,1)$



7) What rule represents this transformation?

$(x,y) \rightarrow '(x, \frac{1}{3}y)$