

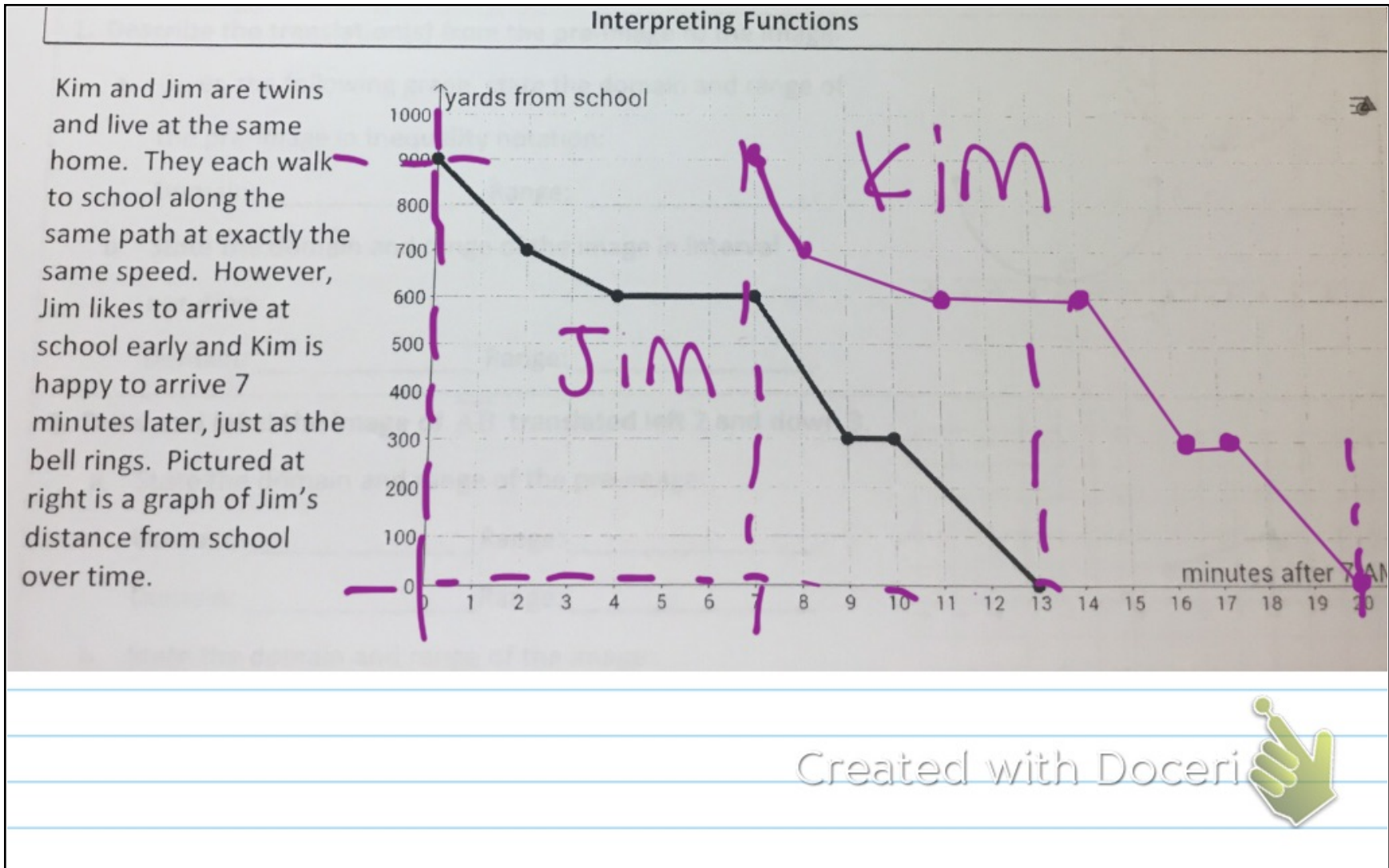
Unit 1 Lesson 8

Interpreting Functions

Domain + Range Transformations

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1. Use a dotted line to sketch Kim's graph of distance from school over time (once she leaves for school).

2. How many minutes after 7AM does Jim leave for school? 0

3. How many minutes after 7AM does Jim arrive at school? 13

4. How many minutes after 7AM does Kim leave for school? 7

5. How many minutes after 7AM does Kim arrive at school? 20

6. What is Jim's farthest distance from school? 900 yd

7. What is Jim's closest distance to school? 0 yd

8. What is Kim's farthest distance from school? 900 yd

9. What is Kim's closest distance to school? 0 yd

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➤ Use your answers to the above questions to fill in the following:

10. Jim's domain: $0 \leq x \leq 13$
(where x represents time after 7AM)

11. Kim's domain: $7 \leq x \leq 20$
(where x represents time after 7AM)

12. Jim's range: $0 \leq y \leq 900$
(where y represents distance from school)

13. Kim's range: $0 \leq y \leq 900$
(where y represents distance from school)

➤ Inequalities can also be written in **interval notation**. Parentheses and/or brackets are used to show whether the endpoints are excluded or included. For example, $[3, 8)$ is the **interval** of real numbers between 3 and 8, **including** 3 and **excluding** 8. Another example, $[4, \infty)$ is the interval of real numbers greater than or equal to 4.

Domain: All values for which x is defined

Range: All values for which y is defined



Domain and Range in Translations

➤ Quick review: The **domain** is the set of all possible x - values on the graph. The **range** is the set of all possible y - values on the graph.

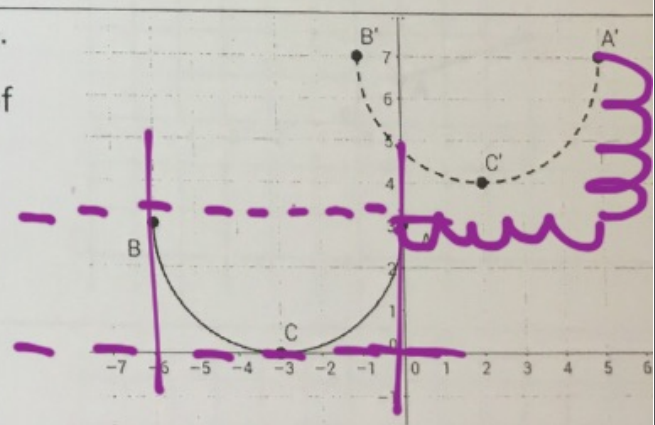
1. Describe the translation(s) from the pre-image to the image.

a. Given the following graph, state the domain and range of the pre-image in inequality notation:

Domain: $[-6, 0]$ Range: $[0, 3]$

b. State the domain and range of the image in interval notation:

Domain: $[-1, 5]$ Range: $[4, 7]$



$$(x, y) \Rightarrow (x+5, y+4)$$

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2. Draw and label the image of \overline{AB} translated left 2 and down 3.

a. State the domain and range of the pre-image:

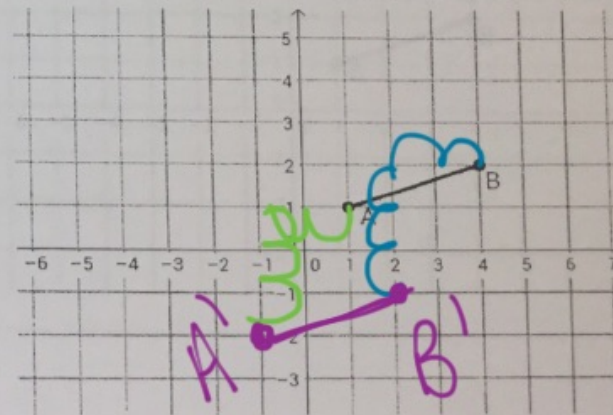
Domain: $[1, 4]$ Range: $[1, 2]$

Domain: $1 \leq x \leq 4$ Range: $1 \leq y \leq 2$

b. State the domain and range of the image:

Domain: $[-1, 2]$ Range: $[-2, -1]$

Domain: _____ Range: _____



$$(x-2, y-3)$$

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3. Draw and label the image of \overline{AB} reflected over the x-axis.

a. State the domain and range of the pre-image:

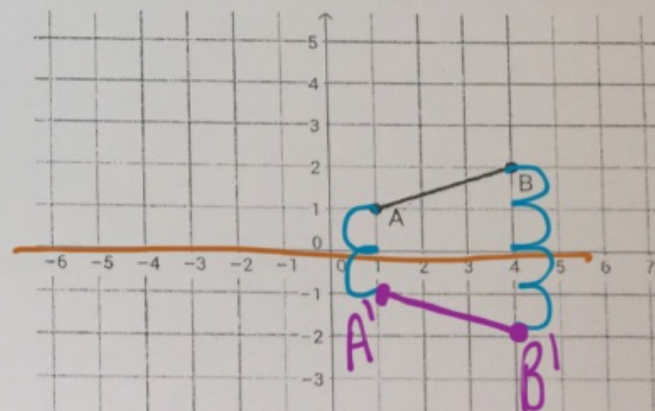
Domain: $[1, 4]$ Range: $[1, 2]$

Domain: $1 \leq x \leq 4$ Range: $1 \leq y \leq 2$

b. State the domain and range of the image:

Domain: $[1, 4]$ Range: $[-2, -1]$

Domain: _____ Range: _____



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

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4. Draw and label the image of \overline{AB} reflected over the y-axis.

a. State the domain and range of the pre-image:

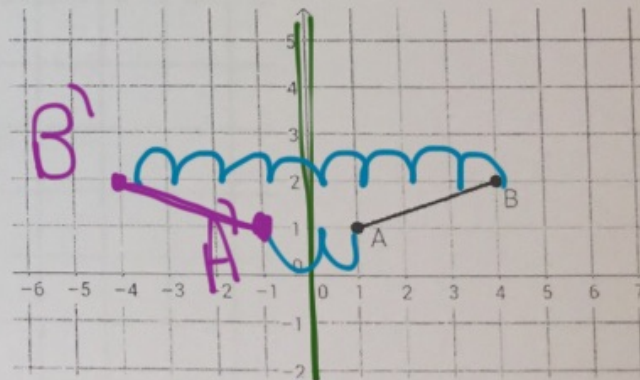
Domain: $[1, 4]$ Range: $[1, 2]$

Domain: -1 -4 Range: \downarrow

b. State the domain and range of the image:

Domain: $[-4, -1]$ Range: $[1, 2]$

Domain: $-4 \leq x \leq -1$ Range: $1 \leq y \leq 2$



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

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5. Draw and label the image of \overline{AB} reflected over the line $y = x$.

a. State the domain and range of the pre-image:

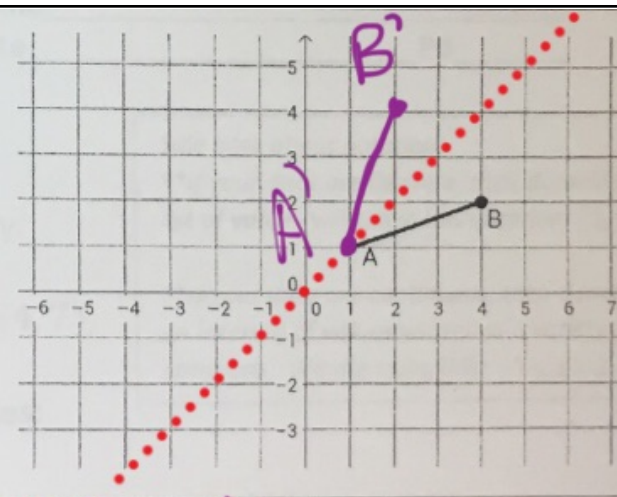
Domain: $[1, 4]$ Range: $[1, 2]$

Domain: _____ Range: _____

b. State the domain and range of the image:

Domain: $[1, 2]$ Range: $[1, 4]$

Domain: $1 \leq x \leq 2$ Range: $1 \leq y \leq 4$



$$\begin{array}{l}
 A(1,1) \\
 B(4,2)
 \end{array}
 (x,y) \rightarrow (y,x)
 \begin{array}{l}
 A'(1,1) \\
 B'(2,4)
 \end{array}$$

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6. Draw and label the image of \overline{AB} rotated 90° .

a. State the domain and range of the pre-image:

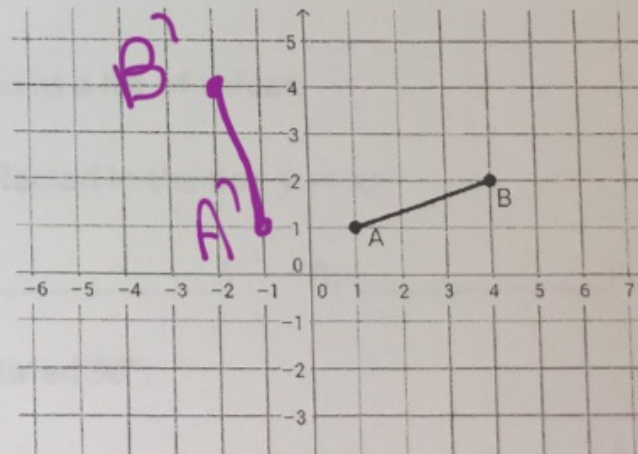
Domain: $[1, 4]$ Range: $[1, 2]$

Domain: _____ Range: $-1 - 2$

b. State the domain and range of the image:

Domain: $[-2, -1]$ Range: $[1, 4]$

Domain: _____ Range: _____



$$\begin{array}{l}
 A(1, 1) \\
 B(4, 2)
 \end{array}
 \quad
 (x, y) \rightarrow (-y, x)
 \quad
 \begin{array}{l}
 A'(-1, 1) \\
 B'(-2, 4)
 \end{array}$$

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7. Draw and label the image of AB dilated by a scale factor of 3.

a. State the domain and range of the pre-image:

Domain: $[1, 4]$ Range: $[1, 2]$

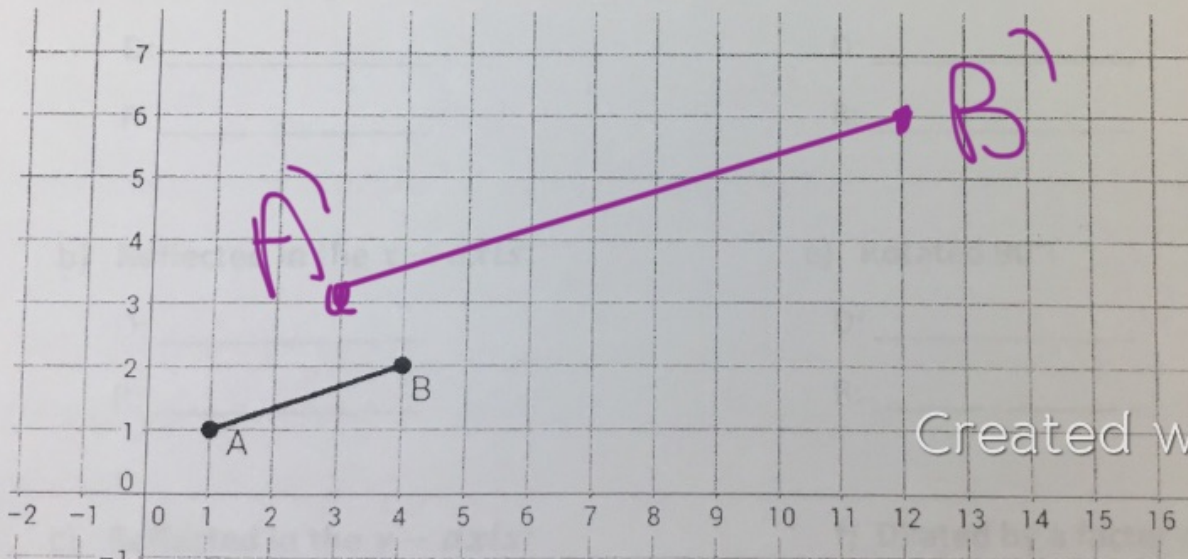
Domain: ~~$X \leq 3$~~ Range: ~~$X \leq 3$~~

b. State the domain and range of the image:

Domain: $[3, 12]$ Range: $[3, 6]$

Domain: $3 \leq x \leq 12$ Range: $3 \leq y \leq 6$

$A(1, 1)$ $B(4, 2)$ $A'(3, 3)$ $B'(12, 6)$



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Page 37 CW/HW

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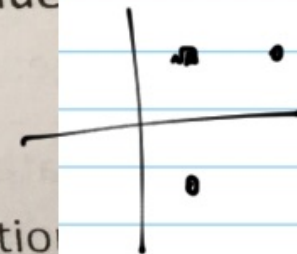
Lesson 8 – Functions CLASSWORK/HOMEWORK

Classwork: Given the patterns seen above, can you predict the domain/range of an image given a pre-image domain/range? Let's try:

1. Given a relation composed of points $A(2, 5)$, $B(1, -6)$, and $C(4, 7)$

A) State the domain and range of the relation as a list of values

D: $\{1, 2, 4\}$ R: $\{-6, 5, 7\}$



B) State the domain and range of the image when the relation is transformed

a) Translated right 2 and down 3:

D: $\{3, 4, 6\}$ R: $\{-9, 2, 4\}$

d) Ref

D: {

b) Reflected in the x - axis:

e) Rc

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