Dilations

**CORE STANDARDS**

HSG.SRT.A.1

LESSON

**5-3**

OBJECTIVE **1. SWBAT perform dilations of figures in the coordinate plane and solve other proportionality problems.**

NOTES

Dilations

A dilation has 2 parts that define it: the **center** and the **scale factor**.

In the illustration below, the center is point *P* and the scale factor is 2.

In this illustration, *ABC* is the **preimage**, and *A’B’C’* is the **image**.

An image point is on the same line as the preimage point and the center.

Scale factor = 

Dilations in the Coordinate Plane

In a coordinate plane, if the dilation’s center is at the origin, (0,0), then the coordinate of the image point can be found by multiplying each coordinate of the preimage point by the scale factor.

*A’*

*P*

*B*

*A*

*B’*

*C*

*C’*

EXAMPLES

**1.** Perform the dilation of *ABC* centered at *P* by **2.** Identify the center and scale factor of the dilation

 a scale factor of 1.5. illustrated below.

*C*

*B*

*A*

*P*

*A*

*B*

*C*

*A’*

*B’*

*C’*

**3.** Given point *G* at (–4, 12), find *G’* dilated by a **4.** Given segment *UV* with *U* at (5, 8) and *V* at (–9, 2),

 scale factor of , centered at the origin. find the coordinates of *U’* and *V’* dilated by a scale

 factor of 4.5, centered at the origin.

**5.** Given segment *JK* with *J* at (–6, 1) and *K* at (4, –14), find point *P* such that the ratio of *JP*:*PK* = 2:3.

PRACTICE **5-3** NAME\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 [SHOW YOUR WORK]

Perform the dilation of *ABC* centered at *P* by the given scale factor.

*C*

*B*

*A*

*P*

Scale Factor: 0.5

1. 2.

*C*

*B*

*A*

*P*

Scale Factor: 2

*C*

*B*

*A*

*P*

Scale Factor: 1/3

*C*

*B*

*A*

*P*

Scale Factor: 3

1. 4.

Mark the center *P* of each dilation and calculate the scale factor.

*A*

*B*

*C*

*A’*

*B’*

*C’*

1. 6.

*A*

*B*

*C*

*A’*

*B’*

*C’*

1. Write a rule about the scale factor of a dilation that tells you whether the image will be larger or smaller than the preimage.
2. Given segment *UV* with *U* at (10, –16) and *V* at (–4, 8), Find the coordinates of *U’* and *V’* dilated by a scale factor of 3.5, centered at the origin.
3. Given segment *UV* with *U* at (–8, –2) and *V* at (5, 20), Find the coordinates of *U’* and *V’* dilated by a scale factor of 0.2, centered at the origin.
4. Given segment *JK* with *J* at (–8, 9) and *K* at (4, –7), find point *P* such that the ratio of *JP*:*PK* = 1:3.

*Q*

*R*

*S*

1. Given segment *JK* with *J* at (11, –2) and *K* at (3, 22), find point *P* such that the ratio of *JP*:*PK* = 3:5.
2. Use the coordinate plane at the right to perform a dilation of *QRS* centered at the origin with a scale factor of –2. What is different about the image of a dilation with a negative scale factor versus a positive scale factor?