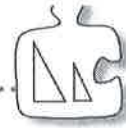


### 4.2.2 How does it change?

#### Enlarging and Reducing Figures

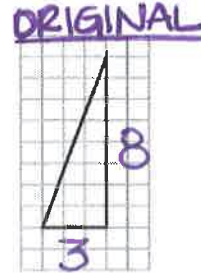


In today's warm up (Pg. 86) you learned that **enlarge** means to *get bigger* and **reduce** means to *get smaller*.



4-5

4-53. Carmen and Dolores want to **enlarge** the triangle at right. Its base is three units long. They want the base of their new triangle to be 12 units long, and they want the shape of the new triangle to stay the same. However, they disagree about what the new triangle's height should be.



b)  
c)  
a  
tr

- a) Work with your team to predict the height of the new triangle.
- b) Carmen noticed that the new base is 9 units longer than the original one, so she thinks that the height of the new triangle should be 9 units longer, or 17 units high. Dolores noticed that the new base is 4 times longer, so she thinks that the height of the new triangle should be 4 times longer, or 32 units high.
  - i. On graph paper, draw the original triangle as well as the triangles that Carmen and Dolores describe.
  - ii. Who is correct? How can you tell?
- c) What if Carmen and Dolores wanted to reduce the shape so that the base of the new smaller triangle is 1 unit long? How tall should the triangle be to keep its original shape? How did you figure this out? Draw the new shape on your graph paper.

4-54

4-54. Since some of the copiers at CPM Middle School are broken, the math teachers plan to do all of their reductions and enlargements by hand. They need your team's help. Using graph paper, draw each of the original figures described in parts (a) and (b) below and enlarge or reduce them as described.

- a) Draw a rectangle that measures 5 units by 3 units. Enlarge it so that each side is four times as long as the original.
- b) Draw a right triangle with a base of 2 units and a height of 3 units. Make three "copies" so that the lengths of the new sides are 50% ( $\frac{1}{2}$  the size), 300% (3 times the size), and 500% (5 times the size) of the original.



**\*Reminder:** 100% (or to multiply by 1) would not change the size.

53

50%      300% (x3)

916

4-53 a) Our team predicts that the height of the new triangle will be \_\_\_\_\_ units long.

b) Dolores is correct because her triangle is the same shape as the original.

c) To reduce from 3 units to 1 unit using Dolores' method would mean dividing by 3. The height of the reduced triangle should be  $2.\bar{6}$  units tall.

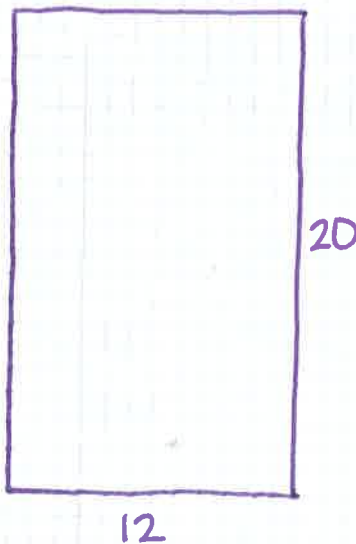
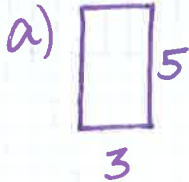
$$8 \div 3 = 2.\bar{6}$$

4-54

4-54

b) c)

53

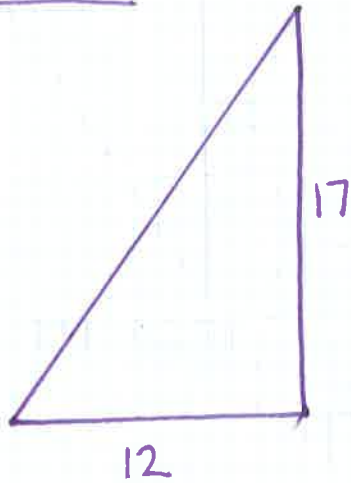


50%

350% (x3)

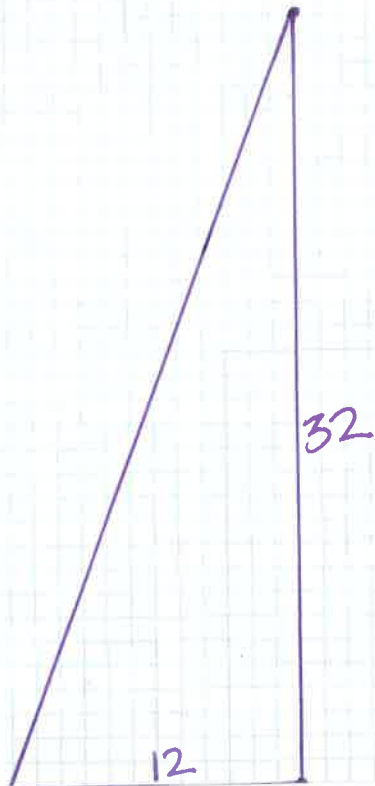
b) Carmen: 9 units longer (+9)

4-53



Dolores: 4 times longer ( $\times 4$ )

4-



c) Reduce ( $\div 3$ )

$\frac{2.16}{1}$

4-54

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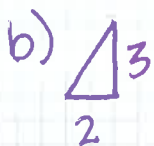
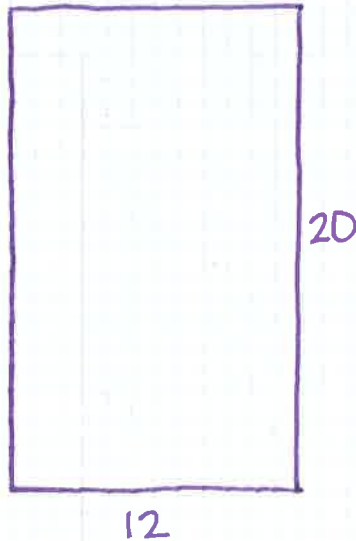
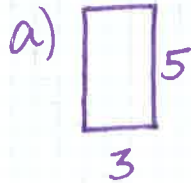
b) Dolores is correct because her triangle is the same shape as the original.

c) To reduce from 3 units to 1 unit using Dolores' method would mean dividing by 3. The height of the reduced triangle should be  $2.\bar{6}$  units tall.

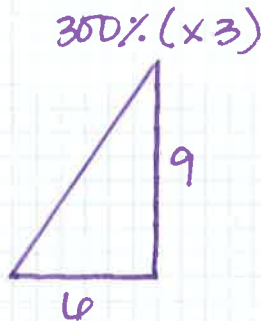
$$8 \div 3 = 2.\bar{6}$$

4-54

4-54



50%  
 $\Delta 1.5$   
1



500% (x5)

