Changing Dimensions: Area Use What You've Learned

1. Sketch three different rectangles that are similar to the one shown below using the following directions:
Rectangle 1: Double the base and the height (scale factor = 2).
Rectangle 2: Triple the base and the height (scale factor =3).
Rectangle 3: Quadruple the base and the height (scale factor $=4$ )

2. Find the perimeter of each of the rectangles.
3. Find the area of each of the rectangles.
4. Study your results for problems 1-3. What happens to the perimeter and area of the rectangle when you double the dimensions, triple the dimensions, quadruple the dimensions, or make the dimensions $n$ times as large (scale factor $=n$ )? Record your answers in the following table.

| Scale Factor | Perimeter | Area |
| :---: | :--- | :--- |
| $\mathbf{1}$ |  |  |
| 2 |  |  |
| $\mathbf{3}$ |  |  |
| 4 |  |  |
| $\mathbf{n}$ |  |  |

MAKING SENSE OF MATHEMATICS
5. Describe how the perimeter of a rectangle changes when you make each dimension $n$ times as large. Justify your answer.
6. Describe how the area of a rectangle changes when you make each dimension $n$ times as large. Justify your answer.
7. Sketch a rectangle that is similar to the following rectangle. Make the base and height one half of the original base and height. What happens to the perimeter and area of a rectangle when you make the dimensions $1 / 2$ as large? Does this follow the pattern you described above?


MAKING SENSE OF MATHEMATICS
8. Samantha used four balls of yarn to knit a doll blanket. Now she wants to knit a similar blanket that is three times as long and three times as wide. How many balls of yarn will she need to complete the larger blanket?
9. Emma plans to make the area of her garden four times as large as it was last year. Her old and new gardens are similar rectangles. Emma wants to use her existing fence to enclose the new garden, but knows she will not have enough. How much of the new garden can she enclose with the existing fence?
10. Jason and Jared have a lawn-mowing service. They charge $\$ 20$ per hour. One lawn was 150 ft . by 100 ft . and it took $11 / 2$ hours to mow. They charged $\$ 30$. How much should they charge for a similar lawn that is 300 ft . by 200 ft .?

