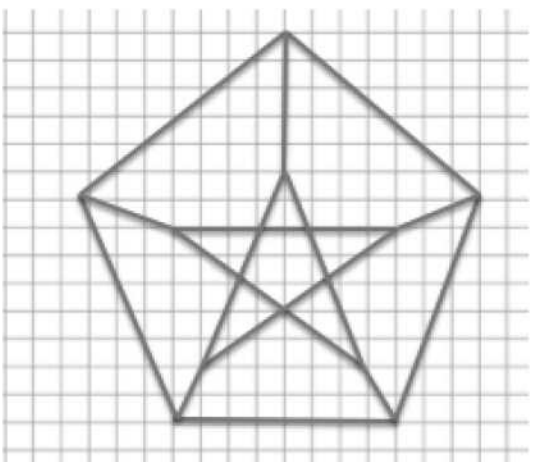
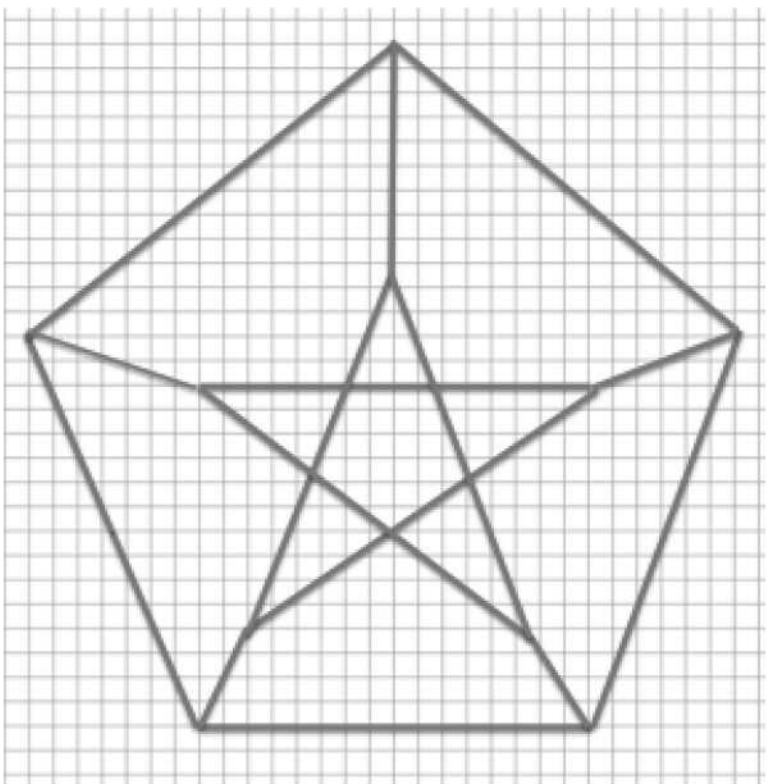
Name _____ Date _____

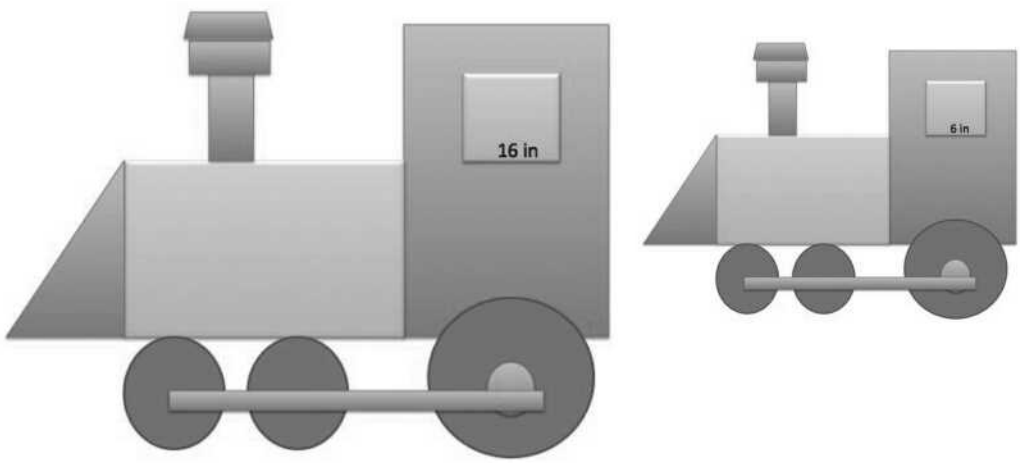
# Computing Actual Lengths from a Scale Drawing

Each of the designs shown below is to be displayed in a window using strands of white lights. The smaller design requires 225 feet of lights. How many feet of lights does the enlarged design require? Support your answer by showing all work and stating the scale factor used in your solution.

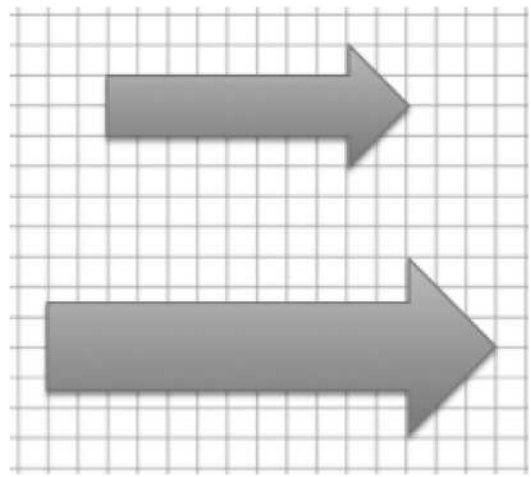




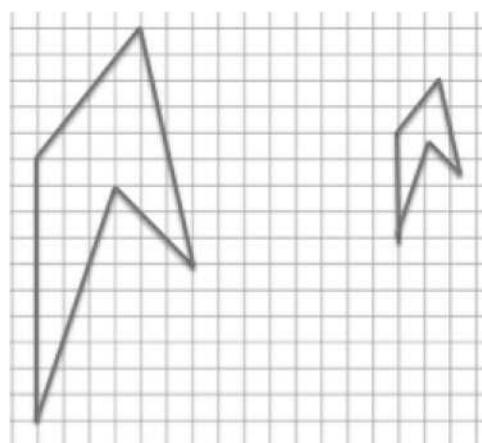
1. The smaller train is a scale drawing of the larger train. If the length of the tire rod connecting the three tires of the larger train, as shown below, is 36 inches, write an equation to find the length of the tire rod of the smaller train. Interpret your solution in the context of the problem.



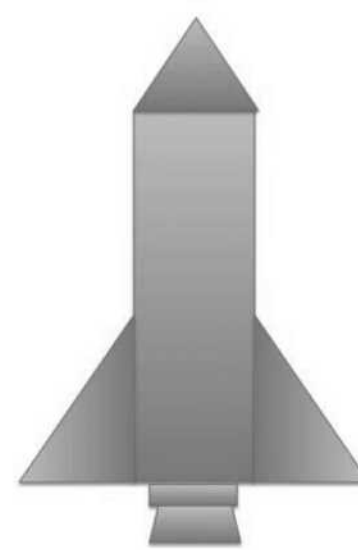
2. The larger arrow is a scale drawing of the smaller arrow. The distance around the smaller arrow is $28$ units. What is the distance around the larger arrow? Use an equation to find the distance and interpret your solution in the context of the problem.



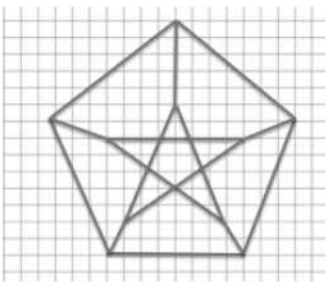
3. The smaller drawing below is a scale drawing of the larger. The distance around the larger drawing is $39.3$ units. Using an equation, find the distance around the smaller drawing.

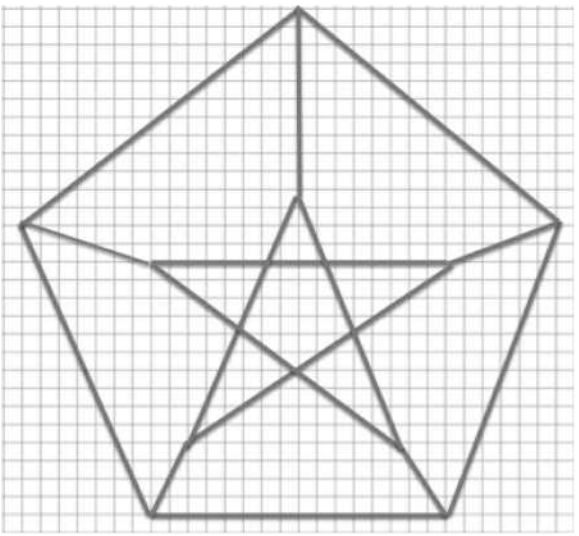


4. The figure is a diagram of a model rocket. The length of a model rocket is $2.5$ feet, and the wing span is $1.25$ feet. If the length of an actual rocket is $184$ feet, use an equation to find the wing span of the actual rocket.



**Each of the designs shown below is to be displayed in a window using strands of white lights. The smaller design requires $225$ feet of lights. How many feet of lights does the enlarged design require? Support your answer by showing all work and stating the scale factor used in your solution.**





*Scale Factor:*

*Bottom horizontal distance of the smaller design:* $8$

*Bottom horizontal distance of the larger design:* $16$

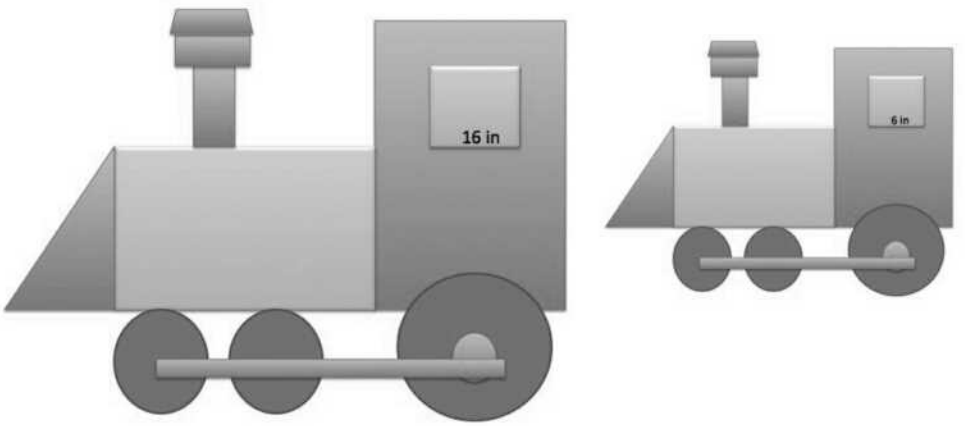
*The smaller design will represent the whole since we are going from the smaller to the larger.*

$$\text{Quantity} = \text{Percent} \times \text{Whole}$$
$$\text{Larger} = \text{Percent} \times \text{Smaller}$$
$$16 = \text{Percent} \times 8$$
$$\frac{16}{8} = 2 = 200\%$$

*Number of feet of lights needed for the larger design:*

$$225 \text{ ft.}\,(200\%) = 225 \text{ ft.}\,(2) = 450 \text{ ft.}$$

1. **The smaller train is a scale drawing of the larger train. If the length of the tire rod connecting the three tires of the larger train, as shown below, is $36$ inches, write an equation to find the length of the tire rod of the smaller train. Interpret your solution in the context of the problem.**




*Scale factor:*

$$\text{Smaller} = \text{Percent} \times \text{Larger}$$
$$6 = \text{Percent} \times 16$$
$$\frac{6}{16} = 0.375 = 37.5\%$$

*Tire rod of small train:* $(36)(0.375) = 13.5$

*The length of the tire rod of the small train is* $13.5$ **in.**

*Since the scale drawing is smaller than the original, the corresponding tire rod is the same percent smaller as the windows. Therefore, finding the scale factor using the windows of the trains allows us to then use the scale factor to find all other corresponding lengths.*

2. **The larger arrow is a scale drawing of the smaller arrow. If the distance around the smaller arrow is $28$ units. What is the distance around the larger arrow? Use an equation to find the distance and interpret your solution in the context of the problem.**

*Horizontal distance of small arrow:* $8$ units

*Horizontal distance of larger arrow:* $12$ units

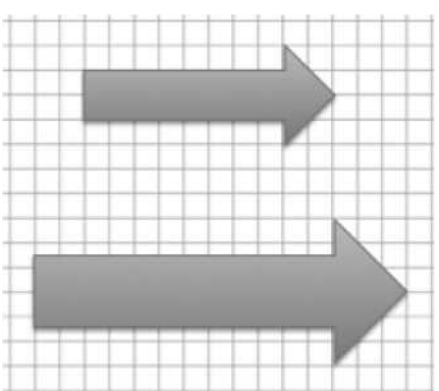
*Scale factor:*

$$\text{Larger} = \text{Percent} \times \text{Smaller}$$
$$12 = \text{Percent} \times 8$$
$$\frac{12}{8} = 1.5 = 150\%$$

*Distance around larger arrow:*

$$(28)(1.5) = 42$$

*The distance around the larger arrow is* $42$ units.



*An equation where the distance of the smaller arrow is multiplied by the scale factor results in the distance around the larger arrow.*