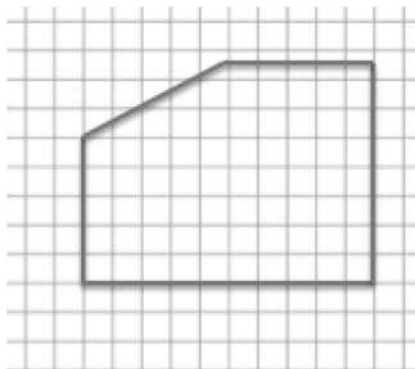Name _____   Date _____

The Scale Factor as a Percent for a Scale Drawing

1. Create a scale drawing of the picture below using a scale factor of 60%. Write three equations that show how you determined the lengths of three different parts of the resulting picture.

2. Sue wants to make two picture frames with lengths and widths that are proportional to the ones given below. Note: The illustration shown below is not drawn to scale.

8 inches

12 inches
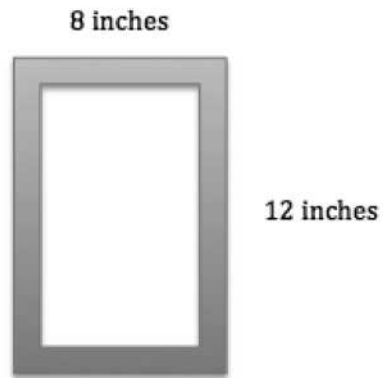
a. Sketch a scale drawing using a horizontal scale factor of 50% and a vertical scale factor of 75%. Determine the dimensions of the new picture frame.

b. Sketch a scale drawing using a horizontal scale factor of 125% and a vertical scale factor of 140%. Determine the dimensions of the new picture frame.

1. Use the diagram below to create a scale drawing using a scale factor of $133\frac{1}{3}\%$. Write numerical equations to find the horizontal and vertical distances in the scale drawing.
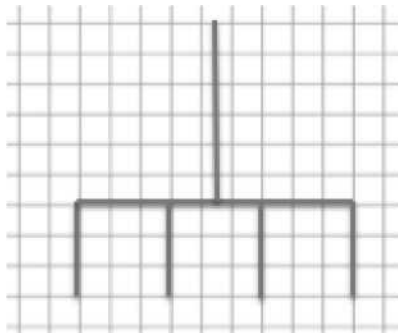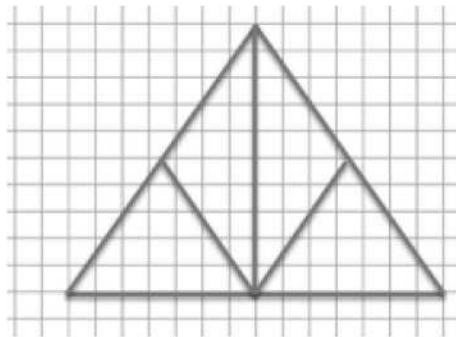

2. Create a scale drawing of the original drawing given below using a horizontal scale factor of 80% and a vertical scale factor of 175%. Write numerical equations to find the horizontal and vertical distances.
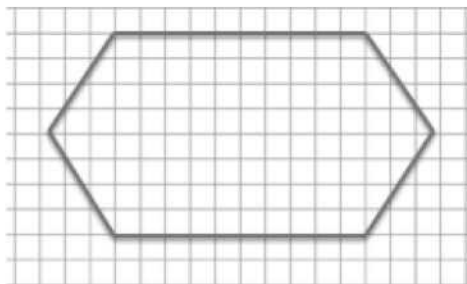
3. The accompanying diagram shows that the length of a pencil from its eraser to its tip is 7 units and that the eraser is 1.5 units wide. The picture was placed on a photocopy machine and reduced to $66\frac{2}{3}\%$. Find the new size of the pencil and sketch a drawing. Write numerical equations to find the new dimensions.


4. Use the diagram to answer each question.

   a. What are the corresponding horizontal and vertical distances in a scale drawing if the scale factor is 25%? Use numerical equations to find your answers.


   b. What are the corresponding horizontal and vertical distances in a scale drawing if the scale factor is 160%? Use a numerical equation to find your answers.

5. Create a scale drawing of the original drawing below using a horizontal scale factor of 200% and a vertical scale factor of 250%.
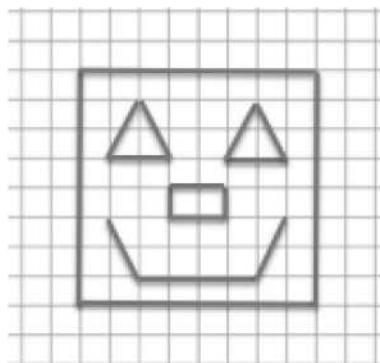
6. Using the diagram below, on grid paper sketch the same drawing using a horizontal scale factor of 50% and a vertical scale factor of 150%.
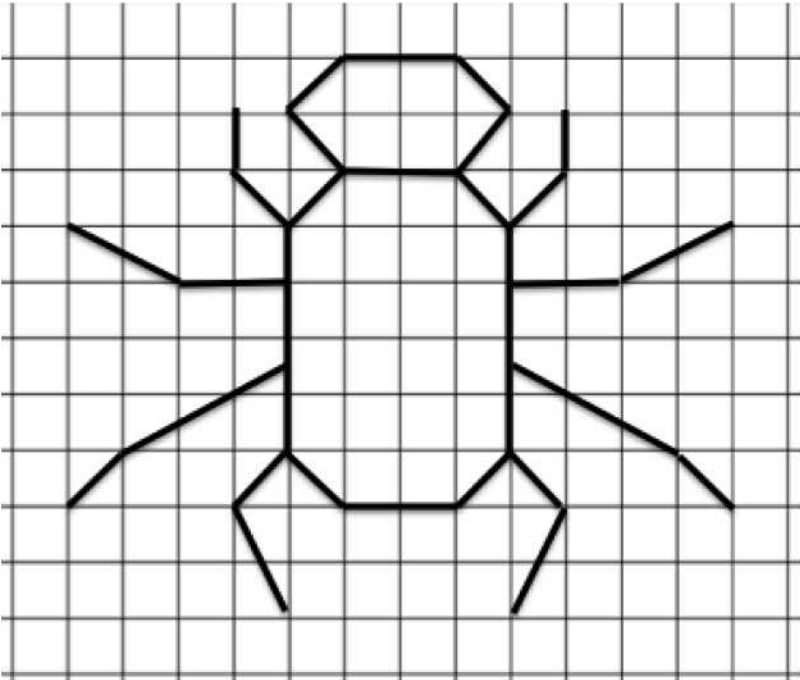
1. Create a scale drawing of the picture below using a scale factor of 60%. Write three equations that show how you determined the lengths of three different parts of the resulting picture.
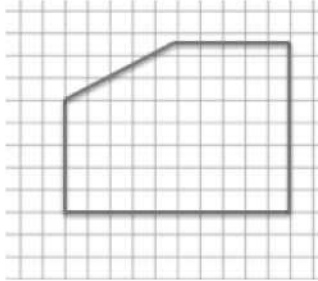
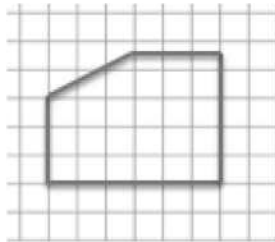|	
Scale factor:	$60\% = \dfrac{60}{100} = \dfrac{3}{5}$
Horizontal distances:	$10\left(\dfrac{3}{5}\right) = 6$
	$5\left(\dfrac{3}{5}\right) = 3$
Vertical distances:	$5\left(\dfrac{3}{5}\right) = 3$
	$7\dfrac{1}{2}\left(\dfrac{3}{5}\right) = \dfrac{15}{2}\left(\dfrac{3}{5}\right) = \dfrac{9}{2} = 4.5$

Scale drawing:

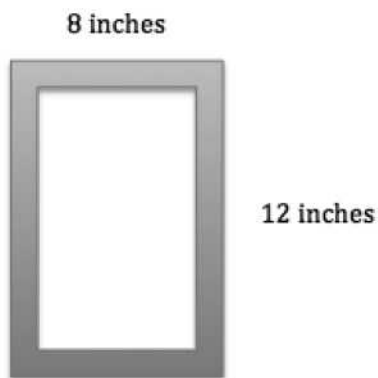*Equations:*

Left vertical distance:	$5 \times 0.60 = 3$
Right vertical distance:	$7.5 \times 0.60 = 4.5$
Top horizontal distance:	$5 \times 0.60 = 3$
Bottom horizontal distance:	$10 \times 0.60 = 6$

2. Sue wants to make two picture frames with lengths and widths that are proportional to the ones given below. Note: The illustration shown below is not drawn to scale.

8 inches

12 inches

a. Sketch a scale drawing using a horizontal scale factor of 50% and a vertical scale factor of 75%. Determine the dimensions of the new picture frame.

Horizontal measurement: $8(0.50) = 4$

Vertical measurement: $12(0.75) = 9$

4 in. by 9 in.

b. Sketch a scale drawing using a horizontal scale factor of 125% and a vertical scale factor of 140%. Determine the dimensions of the new picture frame.
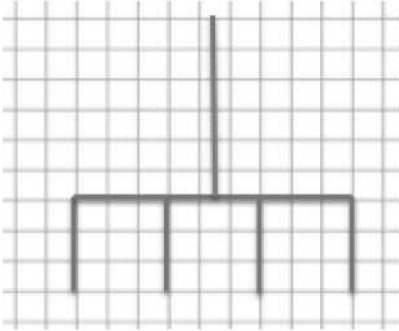
Horizontal measurement: $8(1.25) = 10$

Vertical measurement: $12(1.40) = 16.8$

10 in. by 16.8 in.

1. Use the diagram below to create a scale drawing using a scale factor of $133\frac{1}{3}\%$. Write numerical equations to find the horizontal and vertical distances in the scale drawing.
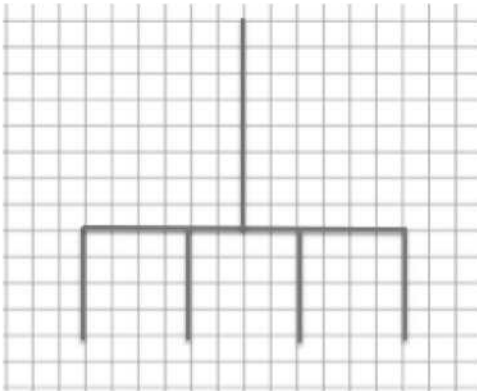

Scale factor: $\dfrac{133\frac{1}{3}\cdot 3}{100\cdot 3} = \dfrac{400}{300} = \dfrac{4}{3}$

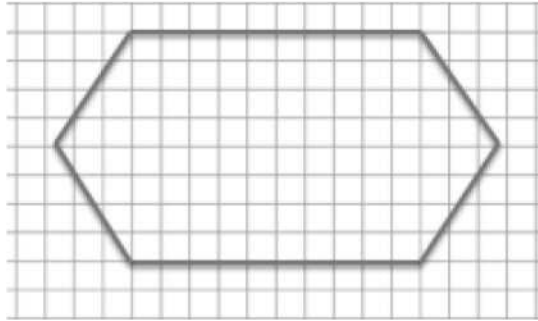*Horizontal distance:* $9\left(\dfrac{4}{3}\right) = 12$

Vertical distance forks: $3\left(\dfrac{4}{3}\right) = 4$

Vertical distance handle: $6\left(\dfrac{4}{3}\right) = 8$

Scale drawing:

2. Create a scale drawing of the original drawing given below using a horizontal scale factor of 80% and a vertical scale factor of 175%. Write numerical equations to find the horizontal and vertical distances.

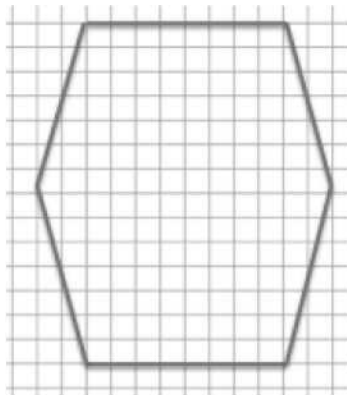*Horizontal scale factor:* $80\% = \dfrac{80}{100} = \dfrac{4}{5}$

Horizontal segment lengths: $10(0.80) = 8$ *or* $10\left(\dfrac{4}{5}\right) = 8$

Horizontal distance: $15\left(\dfrac{4}{5}\right) = 12$

Vertical scale factor: $175\% = \dfrac{175}{100} = \dfrac{7}{4}$

Vertical distance: $8\left(\dfrac{7}{4}\right) = 14$

Scale drawing:

3. The accompanying diagram shows that the length of a pencil from its eraser to its tip is 7 units and that the eraser is 1.5 units wide. The picture was placed on a photocopy machine and reduced to $66\frac{2}{3}\%$. Find the new size of the pencil and sketch a drawing. Write numerical equations to find the new dimensions.

1.5 units

----------------------------7 units---------------------------

Scale factor: $\quad 66\frac{2}{3}\% = \dfrac{66\frac{2}{3} \cdot 3}{100 \cdot 3} = \dfrac{200}{300} = \dfrac{2}{3}$

Pencil length: $\quad 7\left(\dfrac{2}{3}\right) = 4\dfrac{2}{3}$

Eraser: $\quad \left(1\dfrac{1}{2}\right)\left(\dfrac{2}{3}\right) = \left(\dfrac{3}{2}\right)\left(\dfrac{2}{3}\right) = 1$

4. Use the diagram to answer each question.
   a. What are the corresponding horizontal and vertical distances in a scale drawing if the scale factor is 25%? Use numerical equations to find your answers.

   Horizontal distance on original drawing: 14
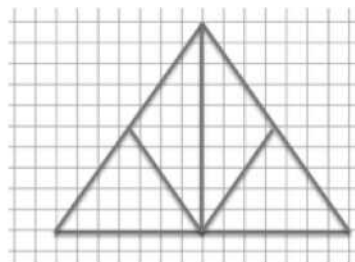
   Vertical distance on original drawing: 10

   Scale drawing:

   Scale factor: 25%

   $\dfrac{25}{100} = \dfrac{1}{4}$

   Horizontal distance: $14\left(\dfrac{1}{4}\right) = 3.5$

   Vertical distance: $10\left(\dfrac{1}{4}\right) = 2.5$

   b. What are the corresponding horizontal and vertical distances in a scale drawing if the scale factor is 160%? Use a numerical equation to find your answers.

   Horizontal distance on original drawing: 14

   Vertical distance on original drawing: 10
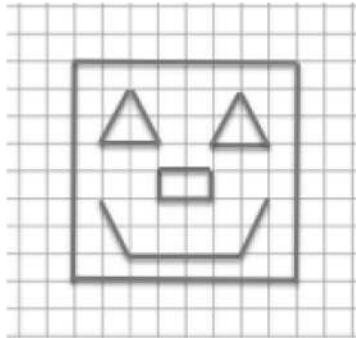
   Scale drawing:

   Scale factor: 160%

   $\dfrac{160}{100} = \dfrac{8}{5}$
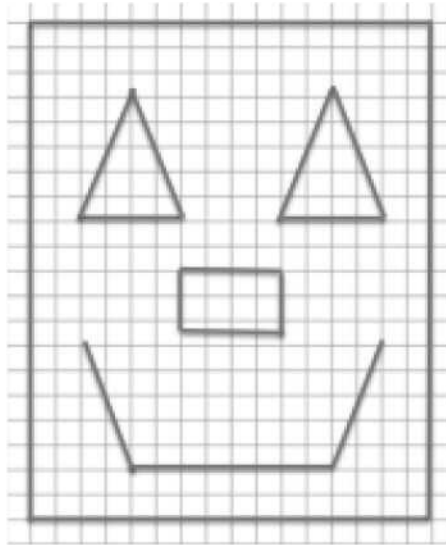
   Horizontal distance: $14\left(\dfrac{8}{5}\right) = 22.4$

   Vertical distance: $10\left(\dfrac{8}{5}\right) = 16$
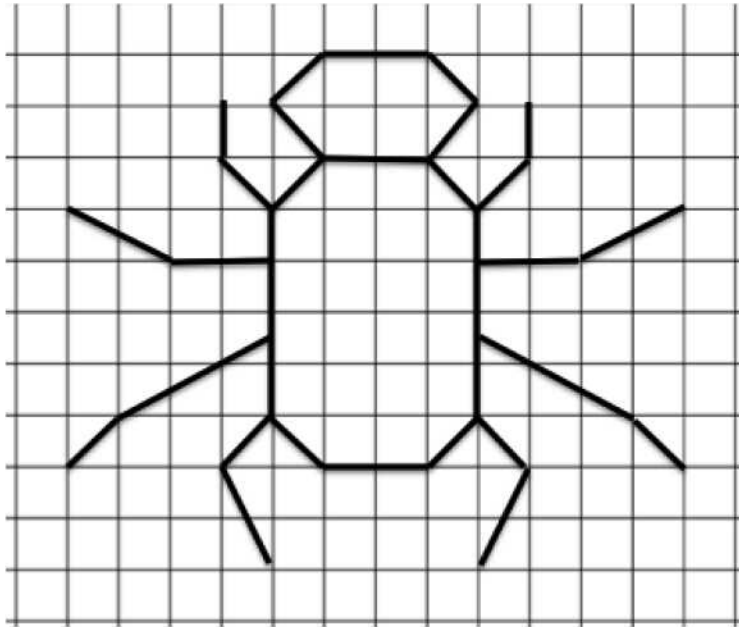
5. Create a scale drawing of the original drawing below using a horizontal scale factor of 200% and a vertical scale factor of 250%.

Answer:

6. Using the diagram below, on grid paper sketch the same drawing using a horizontal scale factor of 50% and a vertical scale factor of 150%.

Answer: