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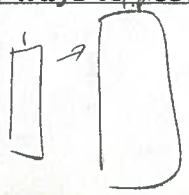
LEARNING OBJECTIVE: We will create scale drawings by identifying the scale factor. (Lesson 53)

CONCEPT DEVELOPMENT:

Scale Factor: the scale factor is calculated from the ratio of any length in the scale drawing to its corresponding length in the actual picture.

Other ways to describe the scale factor:

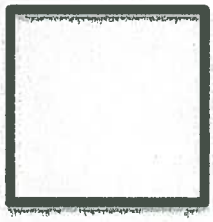
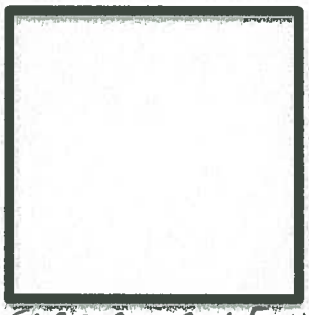


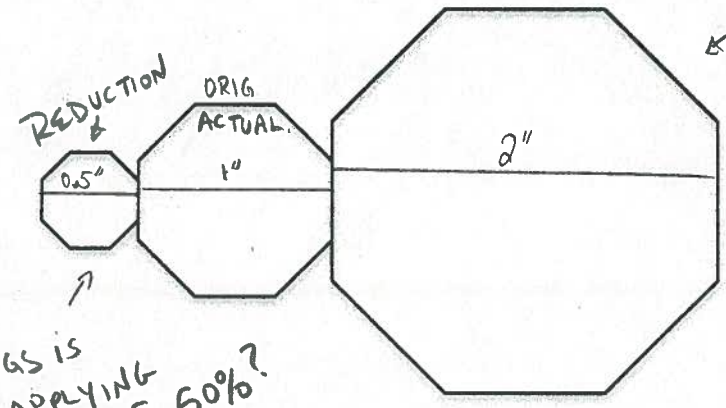
Constant of proportionality
Unit rate
ratio

(Scale factor)
$y = kx$ → Original (actual) picture.
new picture (Scale factor)(actual Actual)

Scaling by factors greater than 1 (or more than 100%) enlarges the segment.
Scaling by factors less than 1 (or less than 100%) reduces the segment.

Example:

Original: 1 inch square	**Enlargement**: $1\frac{1}{2}$ inch square	**Reduction**: $\frac{1}{2}$ inch square
	 SCALE FACTOR OF 1.5, $1\frac{1}{2}$, $\frac{3}{2}$, 150%	 SCALE FACTOR OF .5, $\frac{1}{2}$, 50%



SCALE DRAWING ← SCALE FACTOR OF 2, or 200%

WHICH OF THE SCALE DRAWINGS IS CREATED BY APPLYING A SCALE FACTOR OF 50%?
REDUCTION

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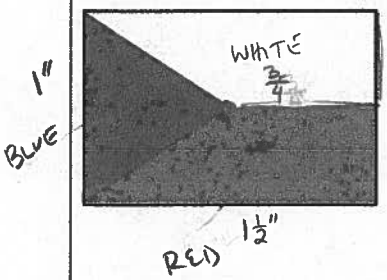
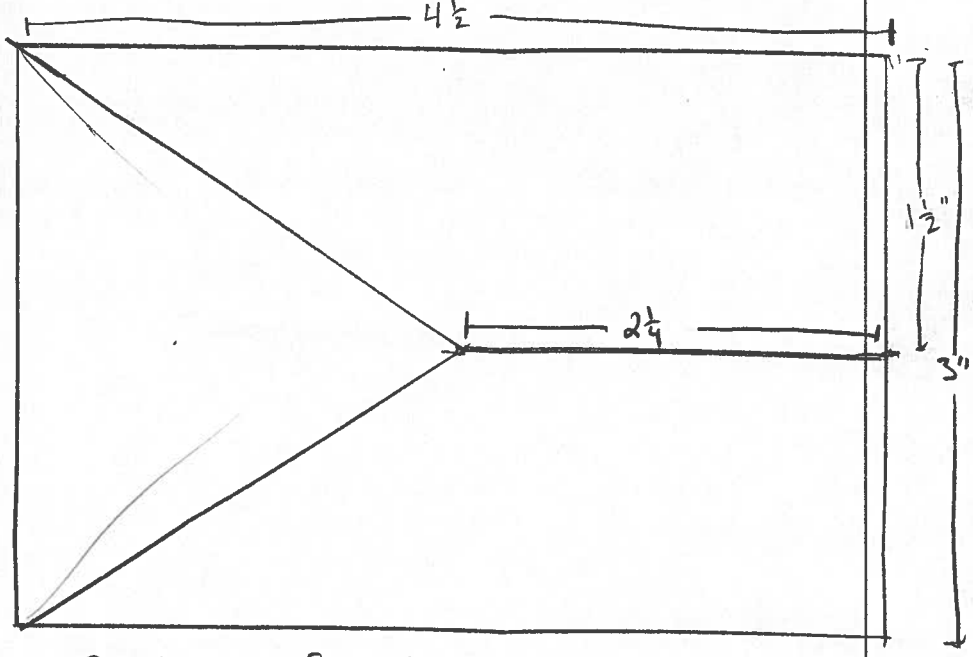
GUIDED PRACTICE:

Steps for Checking Proportionality for Scale Drawings and Original Objects

1. Measure the lengths of the scale drawing and record it on a table.
2. Measure the corresponding lengths on actual pictures and record on a table.
3. Check for the constant of proportionality.
4. Identify the scale factor as both a unit rate and a percent.

Below is a picture of the flag of the Czech Republic. Use a scale factor of 3 to create a scale drawing of the picture.





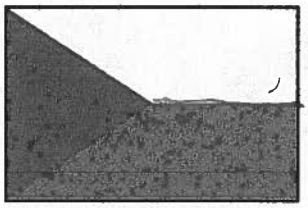
	ORIG. (x)	SCALE (y)
Height	1"	3
Length	1½"	4½
Horiz.	3/4"	2¼

$y = kx$

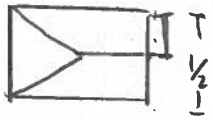
$y = 3x$

300% SCALE FACTOR

Using the same flag, create a scale drawing that uses a scale factor of 50%. ½



	ORIG.	SCALE
Height	1	½
Length	1½	¾
Horiz.	(¾)	⅜



$y = kx$

$y = \frac{1}{2}x$

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Lifetouch comes each year to take school photos. The largest photo taken is 9 inches by 12 inches. The smallest ones are wallet sized photos. They are created by using a scale factor of $\frac{1}{6}$. Draw the outline of the dimensions of the wallet sized photos below.

	ORIG	WALLET
L	$9 \times \frac{1}{6}$	$\frac{9}{6} = 1\frac{1}{2}$
H	$12 \times \frac{1}{6}$	$\frac{12}{6} = 2$

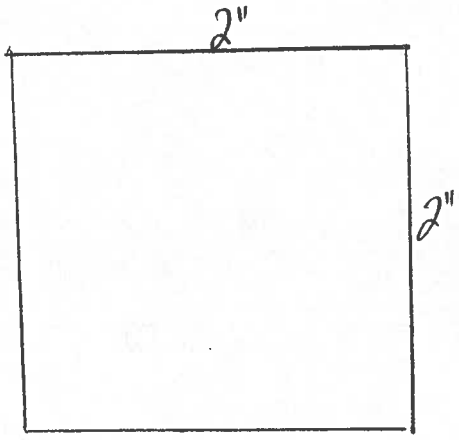
WALLET SIZE

You recently unearthed a family portrait from a long time ago. Your Aunt Barb asked you to take a picture of the portrait using your cell phone and send it to her so she could post it online for Throwback Thursday. If the original portrait was 3 feet by 3 feet and the scale factor is $\frac{1}{18}$, draw the scale drawing that would be the size of the portrait on your phone.

	ORIG	SCALE
H	$3' \times \frac{1}{18}$	$\frac{1}{6}' \times 12 = 2''$
L	$3'$	$\frac{1}{6}' \times 12 = 2''$

H	36"	2"
L	36"	2"

$y = \frac{1}{18}x$



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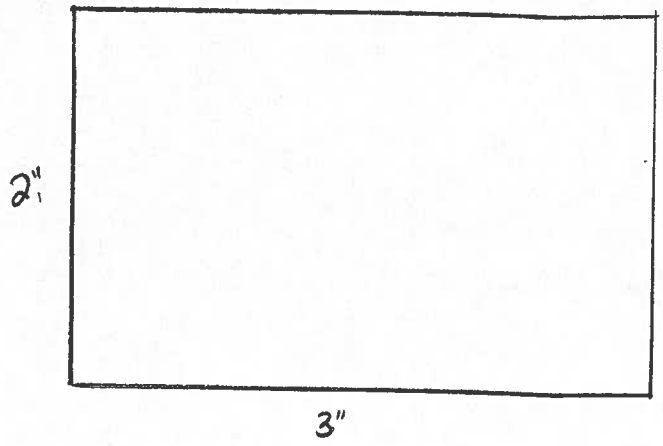
A three-dimensional scale model of our house was built. Our actual house is a 3000% enlargement of the scale model. On the scale model, our front window was 2 inches by 3 inches. What are the dimensions of the actual window?

→ 30x bigger

Scale	Actual
2" × 30	60"
3" × 30	90"



Using the scale model from above, if the actual dimensions of our rectangular living room are 18 feet by 15 feet, how big would the living room be in our scale model?

L x W

7.2 x 6

	ORIG	SCALE
18'	216" ÷ 30	7.2"
15'	180" ÷ 30	6"

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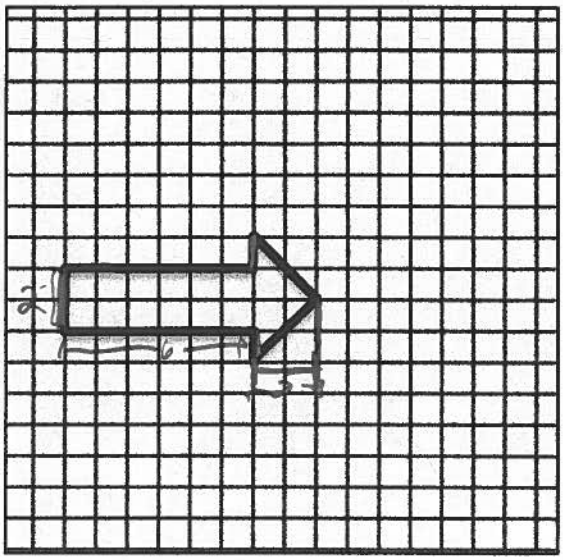
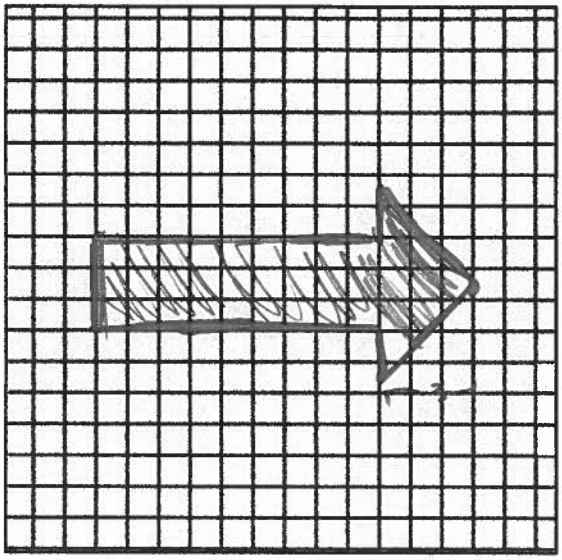
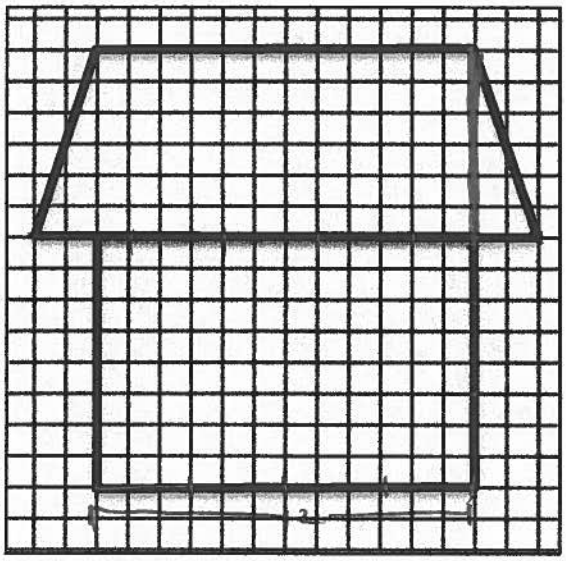
Create a scale drawing of the arrow below using a scale factor of 150%.

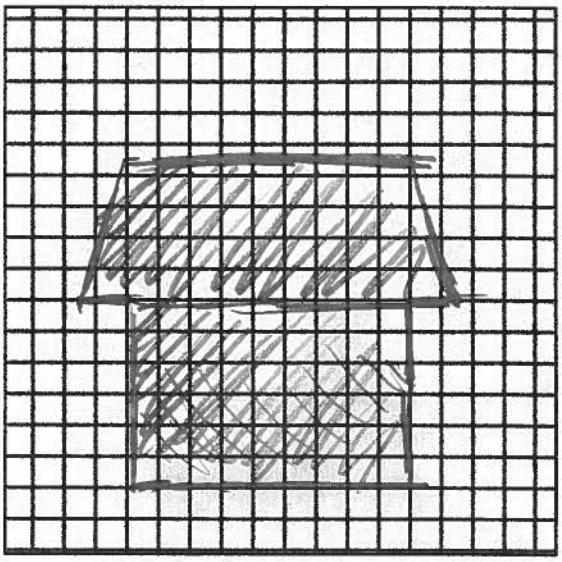




150% $\frac{3}{2}$ SCALE FACTOR.

Create a scale drawing of the house using a scale factor of 75%. $\frac{3}{4}$





Create a scale drawing of the following drawing using a horizontal scale factor of

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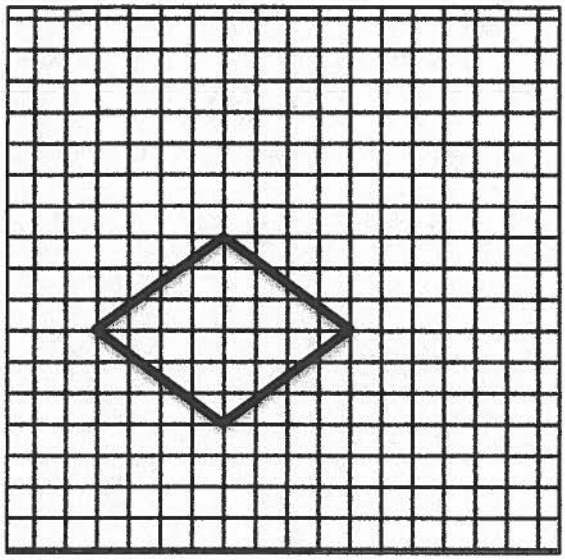
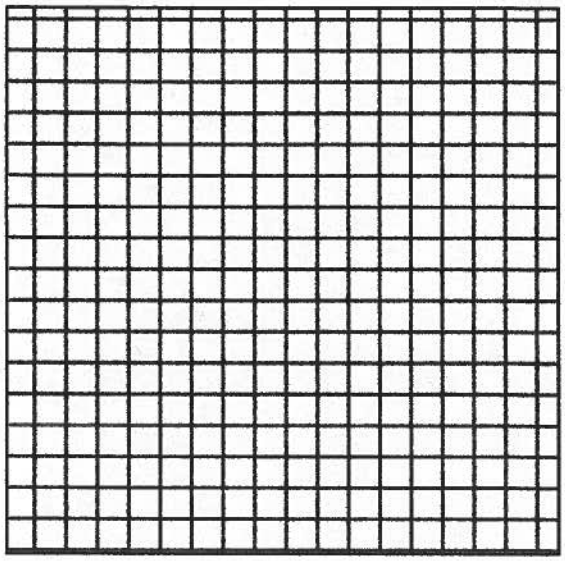
200% and a vertical scale factor of $66\frac{2}{3}\%$.





Write down 3 things you learned today about scale factors:

1. Reductions & Enlargements are two types of Scale drawing.
2. Use tables to help us figure out the scale factor.
3. Easier way to calculate Constant of proportionality
   Scale factor is the same as constant of proportionality.
4. Measure & calculating Scale drawings from original drawings.
5. If scale factor is less than 1 (or 100%) your scale drawing is a reduction. If scale factor is more than 1 (100%) your scaledrawing is an enlargemat.
6. New picture = (scale factor)(orig. picture)
   (scale drawing)
7. Scale factor is represented by percents, fractions, decimals.
8. Scale factor IS unit rate, constant of proportionality