



Holyoke Public Schools

Grade 7

Stretching and Shrinking

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CURRICULUM MAPS OUTLINE

Map Goals:

1. To ensure that students are exposed to a rigorous curriculum in every school and every grade.
2. To have consistent instruction and assessment district wide.
3. To prepare students for the MCAS test.
4. To explain what is expected to be covered in each CMP or Investigations Unit.

Expectations:

The district's expectation is for students to successfully meet the Massachusetts Mathematics Standards. In order to help facilitate this, teachers are required to follow the curriculum maps. The successful implementation of these maps requires teachers to thoroughly read each lesson in the TE and work through the project and problems in the map and the text prior to planning their lessons. Work should be kept in the binder with the curriculum map. Working through the math is an essential part of lesson planning, as it helps the teacher to better understand the concept being taught and the students' possible misunderstandings.

Feedback To Students:

Feedback needs to happen daily in the classroom. There are many ways to give feedback. Conferencing, observations, questions asked during your opening, work time and closing are all forms of feedback.

Map Components:

1. GENERAL PROBING QUESTIONS
2. UNIT SPECIFIC PROBING QUESTIONS
3. GOALS OF UNIT, CONTENT STANDARDS, & PERFORMANCE STANDARDS
4. PROJECT- to be done at end of unit and kept in the portfolio.
5. STUDENT MASTER – for project
6. INVESTIGATIONS
7. NOTEBOOK - includes: 3 Ring Binder, Bound Notebook, Portfolio
8. ACCOUNTABLE TALK – using probing questions

9. ON DEMAND ASSESSMENTS - to be done during teaching of unit.
10. STUDENT MASTERS- for on-demand assessments.

Mathematics Evidence of Learning Artifacts

Artifact	K - 1	2 – 5	6 - 8
<i>3 Ring Binder</i> <i>(3R)*</i>	<ul style="list-style-type: none"> ○ Student Work¹ 	<ul style="list-style-type: none"> ○ Vocabulary ○ Student sheets¹ <p style="text-align: center;"><u>All work should be dated and listed by investigation</u></p>	<ul style="list-style-type: none"> ○ Math books ○ Vocabulary ○ Core Problems¹ ○ Lab sheets <p style="text-align: center;"><u>All work should be dated and listed by investigation</u></p>
<i>Marble Notebook</i> <i>(MNB)</i>	<ul style="list-style-type: none"> ○ Journal entries² 	<ul style="list-style-type: none"> ○ Table of Contents ○ Problem of the day ○ Journal entries ○ Class work <p style="text-align: center;"><u>All work should be dated and listed by investigation in the Table of Contents</u></p>	<ul style="list-style-type: none"> ○ Table of Contents ○ Work time ○ Journal entries <p style="text-align: center;"><u>All work should be dated and listed by investigation in the Table of Contents</u></p>
<i>Portfolio</i> ³ <i>(P)</i>	<ul style="list-style-type: none"> ○ On-demand tasks ○ Projects ○ Teacher anecdotal notes 	<ul style="list-style-type: none"> ○ On-demand tasks ○ Reflections ○ Projects <p style="text-align: center;"><u>All work should be dated and listed by investigation</u></p>	<ul style="list-style-type: none"> ○ On-demand tasks ○ Reflections ○ Projects <p style="text-align: center;"><u>All work should be dated and listed by investigation</u></p>

* Folders may be used in place of binders for these grade levels

¹ Send home at the end of each unit

² Use grade level math journals

³ All documents should be kept for the entire year

Accountable Talk

Probing Assessment Questions

As students progress through this unit, they should be asked the following questions to assess their specific knowledge of the unit.

- *What is the same and what is different about two similar figures?*
- *What determines whether two shapes are similar?*
- *When figures are similar, how are the lengths, areas, and scale factor related?*
- *How can I use information about similar figures to solve a problem?*
- *How can I use similar figures and information I can directly measure to find lengths that I can not directly measure?*
- *What do you know? What do you want to know?*
- *Which strategy did you use?*
- *What does the scale factor tell you about how the figures?*
- *What does the ratio of the side lengths tell you about the figures?*

Probing Questions – Teacher’s Role

The teacher’s role in probing for understanding is to ask questions that will:

- *Clarify student understanding*
- *Get at the objective of the lesson*
- *Go deeper into the mathematics*
- *Uncover misconceptions and misunderstandings*
- *Compare and contrast*

Probing Questions – Student’s Role

The students’ role is to be an active participant by:

- *Explaining their strategies*
- *Asking clarifying questions to teacher and other students*
- *Being active listeners*
- *Using the language of mathematics*

Probing Questions - Suggestions

When probing for understanding the teacher and students can use one or more of these suggested questions:

- *Why are you using $<$ $>$?*
- *What are the ways you could $<$ $>$?*
- *What else do you know?*
- *How do you know that?*
- *Can you show that?*
- *What convention did you use here?*
- *What can you do if you do not know?*
- *What standard does this work apply to?*
- *Is this always true?*
- *How does this connect to other mathematics we have learned?*
- *What is the same and what are the differences between $<$ $>$?*
- *Can you back that up?*
- *Where is the math in your sketch?*
- *What does the answer mean?*
- *Does the answer make sense?*
- *Could you have used another operation to solve this task?*
- *Can you give examples?*

- *Can you say it another way?*
- *What's the math?*
- *Tell me about the task in your own words?*
- *What are you trying to find?*
- *How did you make your estimate?*
- *Will your answer be an over-estimate or an under-estimate? Why?*
- *I noticed that you used <...> to help you understand the task. Can you show us what you did and tell us how it helped you?*
- *Where do you see < > in your <model, diagram, number line, chart, etc.>?*
- *How can we see < > in your <model, diagram, number line, chart, etc.>?*
- *You have used a representation that is different from others that I've seen. Can you show us your <model, diagram, number line, chart, etc.>, and tell us how it helped you?*
- *How did you decide to solve the task? Why did you choose that method?*
- *Did you try any method that didn't work?*
- *Tell us what you tried.*
- *Why didn't it work?*
- *Would it ever work?*

Goals, Content Standards, & Performance Standards

Unit Goals:

- *Identify similar figures by comparing corresponding parts.*
- *Use scale factors and ratios to describe relationships among the side lengths of similar figures.*
- *Construct similar polygons.*
- *Draw shapes on coordinate grids and then use coordinate rules to stretch and shrink those shapes.*
- *Predict the ways that stretching or shrinking a figure affects lengths, angle measures, perimeters, and areas.*
- *Use the properties of similarity to find distances and heights that you can't measure.*

Math Content Standards:

- *7.N.2 Use ratios and proportions in the solution of problems involving unit rates, scale drawings, and reading of maps.*
- *7.N.8 Determine when an estimate rather than an exact answer is appropriate and apply in problem situations.*
- *7.G.2 Classify figures in terms of congruence and similarity, and apply these relationships to the solution of problems.*
- *7.G.3 Demonstrate an understanding of the relationships of angles formed by intersecting lines, including parallel lines cut by a transversal.*
- *7.G.5 Use a ruler, protractor, and compass to draw polygons and circles.*
- *7.G.6 Predict the results of translations and reflections of figures on unmarked or coordinate planes and draw the transformed figure.*
- *7.M.1 Select, convert (within the same system of measurement), and use appropriate units of measurement or scale.*
- *7.M.3 Demonstrate an understanding of the concepts and apply formulas and procedures for determining measures, including those of area and perimeter/circumference of parallelograms, trapezoids, and circles. Given the formulas, determine the surface area and volume of rectangular prisms and cylinders. Use technology as appropriate.*

Performance Standards:

- *(M1f) Reasons proportionally to solve problems involving equal ratios, recognizing the multiplicative nature of these problems in the constant factor of change.*
- *(M2b) Identifies similar and congruent shapes.*
- *(M2e) Recognizes similarity in 2-dimensional figures.*
- *(M2h) Chooses appropriate units of measure and converts with ease between like units, e.g., inches and miles, within a customary or metric system.*
- *(M2i) Reasons proportionally in situations with similar figures.*
- *(M2j) Reasons proportionally with measurements to interpret maps and to make smaller and larger scale drawings.*
- *(M2k) Models situations geometrically to formulate and solve problems.*

Investigation 1: Enlarging and Reducing Shapes

Objectives Investigations 1.1-1.3	Pacing: 4 days
<p style="text-align: center;"><i>Evidence of Learning Artifacts</i></p> <p>Journal and Reflection questions should be posted and referred to at the beginning of the appropriate <i>Investigation</i>.</p> <p>Journal and Reflection entries need to be done in class as part of the closure and assessment</p>	<p><u>Vocabulary</u>²: Appendix 2, Investigation 1</p>
	<p><u>Core Problems</u>²: Stretching and Shrinking, Investigation 1 ACE Problems: #1, 2; 14, 22; 6, 7</p>
	<p><u>Work Time</u>¹: Stretching and Shrinking, Problems. 1.1-1.3</p>
	<p><u>Journal Entries</u>¹: Appendix 3, Inv 1.1,1.2,1.3</p>
	<p><u>On Demand Tasks</u>³: Appendix 5, Investigation 1</p>
	<p><u>Mathematical Reflection</u>³ Appendix 4, MMR1:</p>
<p style="text-align: center;"><i>Accountable Talk</i></p> <p>To promote learning, explore solutions, and justify reasoning, conversations between students and students or students and teacher must be accountable – accountable to the learning community, to the mathematics discipline, and to rigorous thinking.</p>	<p>As a result of this Investigation, students should be able to talk and manipulate the vocabulary of the Investigation in response to this type of question:</p> <ul style="list-style-type: none"> ○ Describe your technique. ○ Is there another way? ○ Where are the similar triangles? ○ How do you know the triangles are similar? ○ Why is indirect measurement useful? When might you need it? <p>These are some recommended questions that you might use. Others can be found at the beginning of the map and on the probing question sheet in the district mathematics guide.</p>

1. Marble Note Book
2.3 Ring Binder
3. Portfolio

Investigation 2: Similar Figures

Objectives Investigations 2.1 – 2.3	Pacing: 5 days
<p style="text-align: center;"><i>Evidence of Learning Artifacts</i></p> <p>Journal and Reflection questions should be posted and referred to at the beginning of the appropriate <i>Investigation</i>.</p> <p>Journal and Reflection entries need to be done in class as part of the closure and assessment</p>	<p><u>Vocabulary</u>²: Appendix 2, Investigation 2</p>
	<p><u>Core Problems</u>²: Stretching and Shrinking , Investigation 2 ACE Problems: #1; 4, 16, 17; 5, 6, 9-13</p>
	<p><u>Work Time</u>¹: Stretching and Shrinking, Problems 2.1 – 2.3</p>
	<p><u>Journal Entries</u>¹: Appendix 3, Inv2.1,2.2,2.3</p>
	<p><u>On Demand Tasks</u>³: Appendix 5, Investigation 2</p>
	<p><u>Mathematical Reflection</u>³ Appendix 4, MMR2:</p>
<p style="text-align: center;"><i>Accountable Talk</i></p> <p>To promote learning, explore solutions, and justify reasoning, conversations between students and students or students and teacher must be accountable – accountable to the learning community, to the mathematics discipline, and to rigorous thinking.</p>	<p>As a result of this Investigation, students should be able to talk and manipulate the vocabulary of the Investigation in response to this type of question:</p> <ul style="list-style-type: none"> ○ What does the algebraic expression tell you about the resulting image? ○ How can you tell if two figures are similar? ○ What are the effects of multiplying each coordinate by a number? ○ What are the effects of adding a number to each coordinate? <p>These are some recommended questions that you might use. Others can be found at the beginning of the map and on the probing question sheet in the district mathematics guide.</p>

1. Marble Note Book
2.3 Ring Binder
3. Portfolio

Investigation 3: Similar Polygons

Objectives Investigations 3.1 – 3.3	Pacing: 4 days
<p style="text-align: center;">Evidence of Learning Artifacts</p> <p>Journal and Reflection questions should be posted and referred to at the beginning of the appropriate <i>Investigation</i>.</p> <p>Journal and Reflection entries need to be done in class as part of the closure and assessment</p>	<p>Vocabulary²: Appendix 2, Investigation 3</p>
	<p>Core Problems²: Stretching and Shrinking, Investigation 3 ACE Problems: #1, 2, 22, 24; 4-6; 7, 9-18</p>
	<p>Work Time¹: Stretching and Shrinking, Problems 3.1 – 3.3</p>
	<p>Journal Entries¹: Appendix 3, Inv 3.1, 3.2, 3.3</p>
	<p>On Demand Tasks³: Appendix 5, Investigation 3</p>
	<p>Mathematical Reflection³ Appendix 4, MMR3:</p>
<p style="text-align: center;">Accountable Talk</p> <p>To promote learning, explore solutions, and justify reasoning, conversations between students and students or students and teacher must be accountable – accountable to the learning community, to the mathematics discipline, and to rigorous thinking.</p>	<p>As a result of this Investigation, students should be able to talk and manipulate the vocabulary of the Investigation in response to this type of question:</p> <ul style="list-style-type: none"> ○ How can you find the scale factor? ○ How does the scale factor affect the ratio of the corresponding side lengths? ○ The areas? ○ The perimeters? ○ Predict what will happen to the nth rep-tile? <p>These are some recommended questions that you might use. Others can be found at the beginning of the map and on the probing question sheet in the district mathematics guide.</p>

1. Marble Note Book

2.3 Ring Binder

3. Portfolio

Investigation 4: Similarity and Ratios

<p><u>Objectives</u> Investigation 4.1 – 4.3</p>	<p><u>Pacing:</u> 4 days</p>
<p style="text-align: center;"><i>Evidence of Learning Artifacts</i></p> <p>Journal and Reflection questions should be posted and referred to at the beginning of the appropriate <i>Investigation</i>.</p> <p>Journal and Reflection entries need to be done in class as part of the closure and assessment</p>	<p><u>Vocabulary</u>²: Appendix 2, Investigation 4</p> <p><u>Core Problems</u>²: Stretching and Shrinking, Investigation 4 ACE Problems: #1, 3, 4, 15-20; 2, 5-8, 27; 12</p> <p><u>Work Time</u>¹: Stretching and Shrinking, Problem 4.1 – 4.3</p> <p><u>Journal Entries</u>¹: Appendix 3, Inv 4.1 – 4.3</p> <p><u>On Demand Tasks</u>³: Appendix 5, Investigation 4</p> <p><u>Mathematical Reflection</u>³ Appendix 4, MMR4:</p>
<p style="text-align: center;"><i>Accountable Talk</i></p> <p>To promote learning, explore solutions, and justify reasoning, conversations between students and students or students and teacher must be accountable – accountable to the learning community, to the mathematics discipline, and to rigorous thinking.</p>	<p>As a result of this Investigation, students should be able to talk and manipulate the vocabulary of the Investigation in response to this type of question:</p> <ul style="list-style-type: none"> ○ How can you use scale factors to find the missing side length? ○ How can you use ratios to find the missing side length? ○ How can you tell if the figures are similar? ○ Is there another ratio you can write? ○ Is that always true? Sometimes true? Never true? <p>These are some recommended questions that you might use. Others can be found at the beginning of the map and on the probing question sheet in the district mathematics guide.</p>

1. *Marble Note Book*
2.3 *Ring Binder*
3. *Portfolio*

Investigation 5: Using Similar Triangles and Rectangles

<p><u>Objectives</u> Investigations 5.1 – 5.3</p>	<p><u>Pacing:</u> 4 days</p>
<p style="text-align: center;"><i>Evidence of Learning Artifacts</i></p> <p>Journal and Reflection questions should be posted and referred to at the beginning of the appropriate <i>Investigation</i>.</p> <p>Journal and Reflection entries need to be done in class as part of the closure and assessment</p>	<p><u>Vocabulary</u>²: Appendix 2, Investigation 5</p> <hr/> <p><u>Core Problems</u>²: Stretching and Shrinking, Investigation 5 ACE Problems: #1, 2, 26; 3, 22, 25; 5, 32-34</p> <hr/> <p><u>Work Time</u>¹: Stretching and Shrinking, Problem replace 5.1 – 5.3</p> <hr/> <p><u>Journal Entries</u>¹: Appendix 3, Inv 5.1, 5.2, 5.3</p> <hr/> <p><u>On Demand Tasks</u>³: Appendix 5, Investigation 5</p> <hr/> <p><u>Mathematical Reflection</u>³ Appendix 4, MMR5:</p>
<p style="text-align: center;"><i>Accountable Talk</i></p> <p>To promote learning, explore solutions, and justify reasoning, conversations between students and students or students and teacher must be accountable – accountable to the learning community, to the mathematics discipline, and to rigorous thinking.</p>	<p>As a result of this Investigation, students should be able to talk and manipulate the vocabulary of the Investigation in response to this type of question:</p> <ul style="list-style-type: none"> ○ Describe your technique. ○ Is there another way? ○ Where are the similar triangles? ○ How do you know the triangles are similar? ○ Why is indirect measurement useful? When might you need it? <p>These are some recommended questions that you might use. Others can be found at the beginning of the map and on the probing question sheet in the district mathematics guide.</p>

1. *Marble Note Book*
2.3 *Ring Binder*
3. *Portfolio*

Appendix 1 Unit Project

<p><i>Project</i>¹</p> <p>Student work should be placed in portfolio</p>	<p>The project is the culminating assessment, which will allow students to apply what they learned about the use of algebraic notation and reasoning. It is written in MCAS form to give students the experience of answering an open-response question.</p> <p>The unit project is called ‘Cycling Team’s Bike Photos and the student handout for the project can be found in Appendix 1</p>
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1. portfolio

NOTE: This Project Question is NOT a prior MCAS question and therefore does not have sample answers showing student work graded at different levels.

**All answers must include explanations in words, computations, and diagrams

**Scoring should be done using the HPS Scoring Rubric.

**

ANSWERS

- a. 12 inches by 15 inches
- b. 50%
- c. $\frac{1}{2}$
- d. The corresponding angles in both photos will have the same measures: all 90° .
- e. Perimeter of original = 36 inches Perimeter of reduced = 18 inches The perimeter of the original is 2 times the size of the reduced photo. OR The perimeter of the reduced photo will be $\frac{1}{2}$ the perimeter of the original photo.
- f. Area of original = 80 sq inches Area of reduced = 20 sq inches The area of the original photo is 4 times as large as the area of the reduced photo. OR The area of the reduced photo will be $\frac{1}{4}$ the area of the original photo.

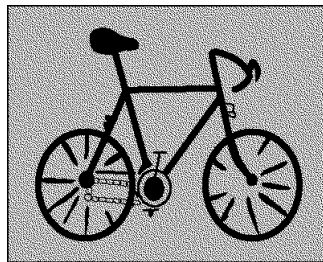
NAME: _____

DATE: _____

UNIT PROJECT: Cycling Team Bike Photos

- *BE SURE TO ANSWER AND LABEL ALL PARTS OF EACH QUESTION.*
- *Show all work (diagrams, tables, and computations) on your answer sheet.*
- *If you do the work in your head, explain in writing how you did the work.*

The coach took a digital photo of the new cycling team bike. She sent an 8 cm by 10 cm photo to each team member.



- a. If the photo were enlarged by a scale factor of 150% of its original size, what would be the new length and width?
- b. Imagine you want to make a 2 cm by 2.5 cm copy of the original photo. What percent should you use?
- c. What scale factor relates the side lengths in the original photo to those in the smaller photo?
- d. How will the angles in the original photo compare to the corresponding angles in the smaller photo?
- e. How will the perimeter of the original photo compare to that of the smaller photo?
- f. Find the areas of the original and the smaller photos. How do these areas compare?

Appendix 2 Vocabulary

Investigation 1:

- *congruent, similar, image, corresponding sides, corresponding angles*

Investigation 2:

- *scale factor, similar, contrast*

Investigation 3:

- *rep-tile*

Investigation 4:

- *ratio, equivalent ratio*

Investigation 5:

- *nested triangles, parallel, indirect measurement*

Appendix 3 Journal Entries

Investigation 1:

Investigation 1.1:

Explain the strategy you used to find the real-life height of the teacher in the picture.

Investigation 1.2:

How do the corresponding side lengths of the original figure and the image compare?

How do the corresponding angles of the original figure and the image compare?

Investigation 1.3:

Compare the original design to the larger image. Describe the change in side lengths, angles, perimeters, and areas.

Investigation 2:

Investigation 2.1

Give a rule for another member of the Wump family. Describe what he or she will look like and how you know.

Investigation 2.2

Describe the hat that will result from the rule $(3x + 2, 3y - 1)$. Explain your reasoning.

Investigation 2.3

On grid paper, draw a parallelogram that is not a rectangle. Make a similar quadrilateral with a scale factor of

Investigation 3

Investigation 3.1

How does the scale factor affect the area of a figure's image?

Investigation 3.2

If the scale factor between two figures is $2/3$, describe how the area of the image relates to the area of the figure?

Investigation 3.3

Tell how you can find a missing side length of two similar figures.

Investigation 4

Investigation 4.1

Why is it necessary to check angle measures in non-rectangular parallelograms, but not in rectangles.

Investigation 4.2

Describe the two ways to decide if two shapes are similar.

Investigation 4.3

How do you decided which side lengths correspond in two similar figures?

Investigation 5

Investigation 5.1

Explain why each angle of the large triangle is congruent to the corresponding angle of the small triangle. on

Investigation 5.2

Sketch the two triangles formed using the mirror method and explain why their corresponding angles are congruent.

Investigation 5.3

Describe your method of finding the missing side length. Use words, a diagram, AND show your computation.

Appendix 4 Reflections

MMR1

When you enlarge or reduce a figure, what features stay the same? What features change? Explain your answer in words and drawings.

MMR2

When a figure is transformed to make a similar figure, what features change and what features stay the same? What does the scale factor tell you about how the figure changes?

MMR3

If two polygons are similar, how can you find the scale factor from one polygon to the other? Show specific examples. Describe how you find the scale factor from the smaller figure to the enlarged figure. Then, describe how you find the scale factor from the larger figure to the smaller figure.

MMR4

Describe at least two ways of finding a missing side length in a pair of similar figures.

MMR5

How can you estimate heights and distances you can't easily measure with rulers or tape measures by using the following methods? (a) shadows and similar triangles (b) mirrors and similar triangles (c) small triangles nested within larger triangles.

Appendix 5 On Demand Tasks

CMP2: Stretching and Shrinking

<p><i>On-Demand Tasks</i></p> <p><u><i>Additional Practice & Skills</i></u></p> <p><u><i>Workbook</i></u></p> <p><u><i>Assessment Resources</i></u></p> <p>In class individualized On-Demand tasks assess knowledge of mathematical facts, operations, concepts, and skills, and their efficient application to problem solving. The results of these different forms of assessment provide rich profiles of students' achievements in mathematics and serve as the basis for identifying curricula and instructional approaches to best develop their talents.</p>	<p><u><i>After Inv. 1</i></u> AP & S p. 21 #1</p> <p><u><i>After Inv. 2</i></u> ACE Questions p. 29 #3</p> <p><u><i>After Inv. 3</i></u> ACE Questions p. 48 #8</p> <p><u><i>After Inv. 4</i></u> ACE Questions p. 68 #9-11</p> <p><u><i>After Inv. 5</i></u> ACE Questions p. 85 #4, 6-9</p>
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HPS Mathematics Scoring Rubric

Score	Description
<u>4</u>	The response shows a <u>comprehensive</u> understanding of the mathematical concept(s) and/or procedures embodied in the task(s). It indicates that the student has <u>completed the task(s)</u> correctly, using mathematically sound procedures. It contains <u>clear, complete explanations</u> and/or <u>adequate work required</u> .
<u>3</u>	The response shows a <u>general</u> understanding of the mathematical concept(s) and/or procedures embodied in the task(s). It indicates that the student has <u>completed the task(s)</u> , using mathematically sound procedures. It contains <u>complete explanations</u> and/or <u>adequate work required</u> .
<u>2</u>	The response shows a <u>basic</u> understanding of the mathematical concept(s) and/or procedures embodied in the task(s). It addresses <u>most aspects of the task(s)</u> , using mathematically sound procedures. It may contain a correct solution but provides <u>incomplete procedures, reasoning and/or explanations</u> . It may reflect <u>some misunderstandings</u> of the underlying mathematical concepts and/or procedures.
<u>1</u>	The response shows a <u>minimal</u> understanding of the mathematical concepts and/or procedures embodied in the task(s). It addresses <u>some elements of the task(s)</u> correctly but reaches an <u>inadequate solution and/or provides reasoning that is faulty or incomplete</u> . It exhibits <u>multiple flaws related to a misunderstanding of important aspects</u> of the task(s), misuse of mathematical procedures, or faulty mathematical reasoning. It reflects a <u>lack of essential understanding</u> of the underlying mathematical concepts. It may contain a correct numerical answer but <u>the required work is not provided</u> .
<u>0</u>	The response is <u>completely incorrect, irrelevant, or incoherent</u> , or contains a correct response arrived at using an <u>obviously incorrect procedure</u> .

NAME: _____

DATE: _____

Investigation 1

- *BE SURE TO ANSWER AND LABEL ALL PARTS OF EACH QUESTION.*
- *Show all work (diagrams, tables, and computations) on your answer sheet.*
- *If you do the work in your head, explain in writing how you did the work.*

1. Refer to the rectangle at the right to answer the following questions.



a. Give the length and width of a larger similar rectangle.
Explain your reasoning.

b. Give the length and width of a smaller similar rectangle. Explain your reasoning.

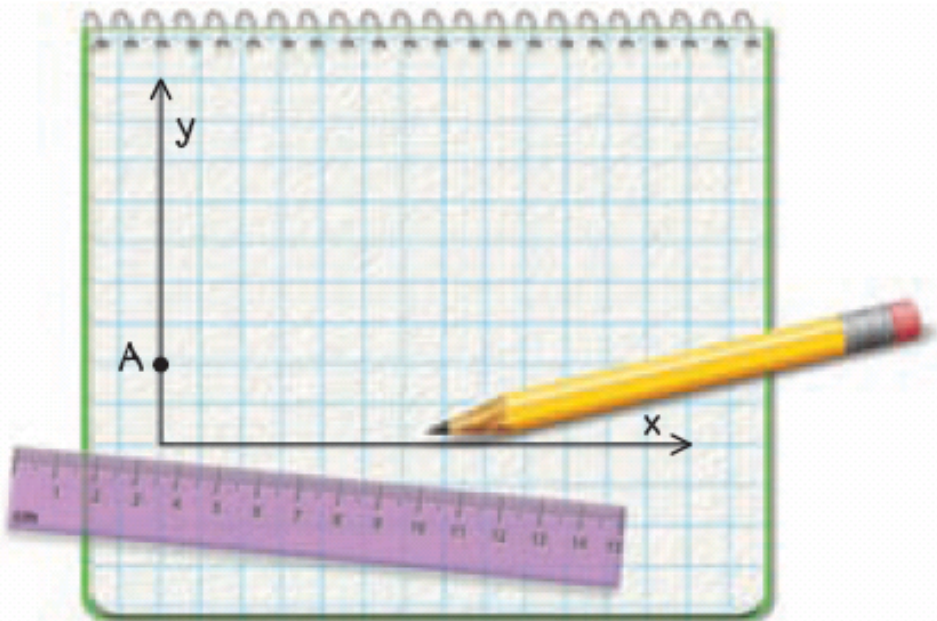
c. Give the length and width of a rectangle that is *not* similar to this one.
Explain your reasoning.

NAME: _____

DATE: _____

Investigation 2

- *BE SURE TO ANSWER AND LABEL ALL PARTS OF EACH QUESTION.*
 - *Show all work (diagrams, tables, and computations) on your answer sheet.*
 - *If you do the work in your head, explain in writing how you did the work.*
- 3. a.** On grid paper, draw triangle ABC with vertex coordinates $A(0, 2)$, $B(6, 2)$ and $C(4, 4)$.



- b.** Apply the rule $(1.5x, 1.5y)$ to the vertices of triangle ABC to get triangle PQR . Compare the corresponding measurements (side lengths, perimeter, area, angle measures) of the two triangles.
- c.** Apply the rule $(2x, 0.5y)$ to the vertices of triangle ABC to get triangle FGH . Compare the corresponding measurements (side lengths, perimeter, area, angle measures) of the two triangles.
- d.** Which triangle, PQR or FGH , seems similar to triangle ABC ? Why?

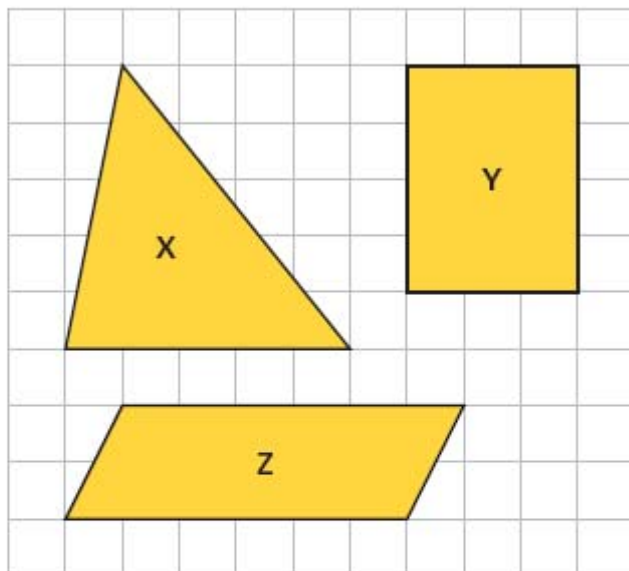
NAME: _____

DATE: _____

Investigation 3

- *BE SURE TO ANSWER AND LABEL ALL PARTS OF EACH QUESTION.*
- *Show all work (diagrams, tables, and computations) on your answer sheet.*
- *If you do the work in your head, explain in writing how you did the work.*

8. For parts (a)–(c), use grid paper.



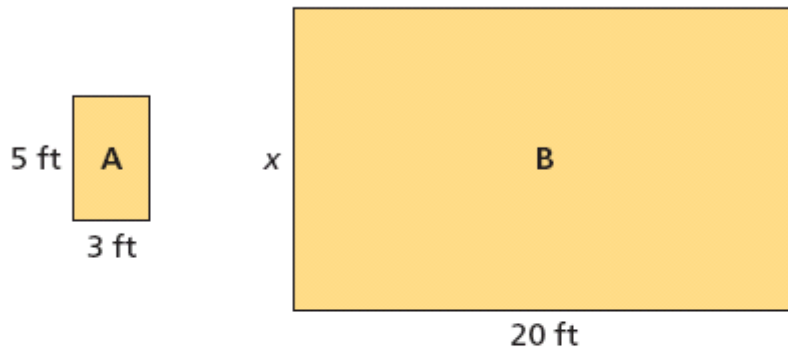
- Sketch a triangle similar to triangle X with an area that is $\frac{1}{4}$ the area of triangle X.
- Sketch a rectangle similar to rectangle Y with a perimeter that is 0.5 times the perimeter of rectangle Y.
- Sketch a parallelogram similar to parallelogram Z with side lengths that are 1.5 times the side lengths of parallelogram Z.

NAME: _____

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Investigation 4

For Exercises 9–11, rectangles A and B are similar.



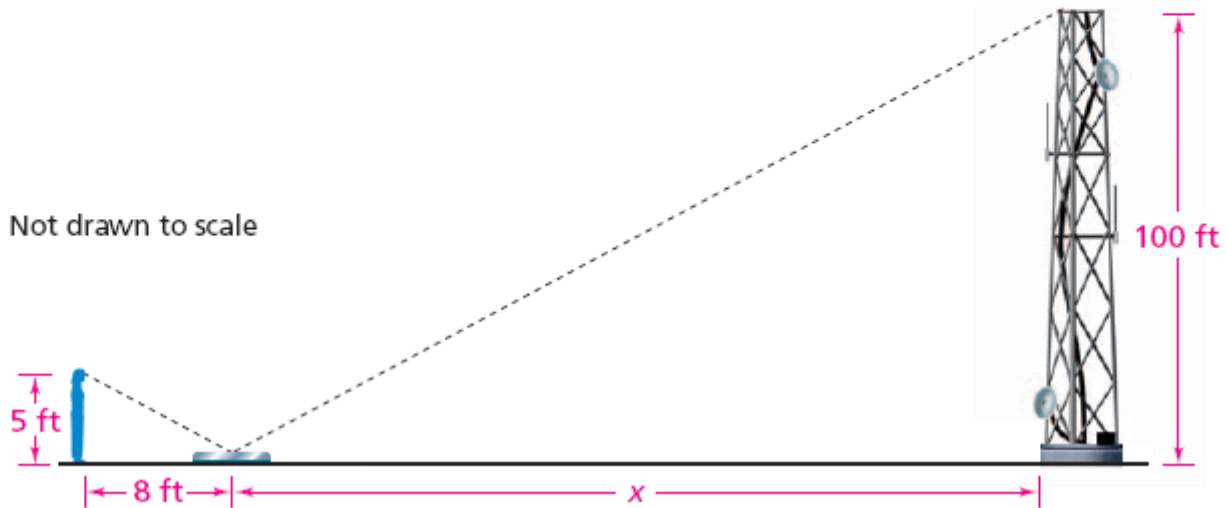
9. **Multiple Choice** What is the value of x ?
- A. 4 B. 12 C. 15 D. $33\frac{1}{3}$
10. What is the scale factor from rectangle B to rectangle A?
11. Find the area of each rectangle. How are the areas related?

NAME: _____

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Investigation 5

4. Stacia stands 8 feet from a mirror on the ground. She can see the top of a 100-foot radio tower in the center of the mirror. Her eyes are 5 feet from the ground. How far is the mirror from the base of the tower?



Find the value of x that makes the fractions equivalent.

6. $\frac{5}{2} = \frac{x}{8}$

7. $\frac{2}{5} = \frac{7}{x}$

8. $\frac{7}{5} = \frac{28}{x}$

9. $\frac{7.5}{10} = \frac{3}{x}$

NOTES