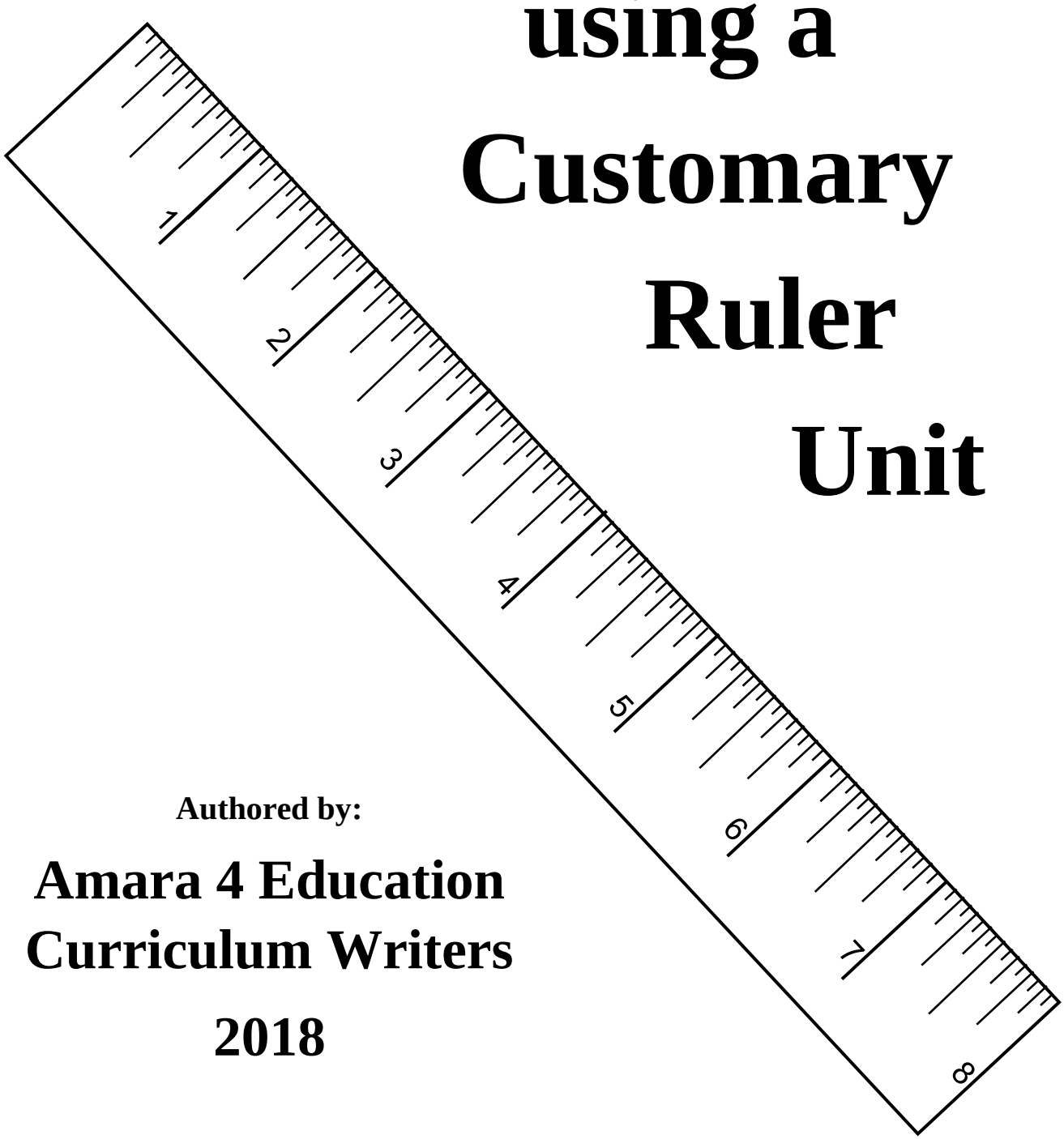
Understanding, Reading and Measuring using a Customary Ruler Unit



Authored by:

Amara 4 Education Curriculum Writers

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Executive Summary

One of the most difficult mathematical areas to teach to elementary and middle school students is correctly reading and accurately measuring using a customary ruler. Unlike the metric system where a millimeter/centimeter ruler is parsed into tenths (1/10's) and the Base 10 transfer between both proper fractions and mixed numbers are an easy equivalent decimal transition, a customary ruler is separated into equal segments of either eighths (1/8's) or sixteenths (1/16's). Hence, the customary ruler is much more difficult for students to indirectly compute decimal equivalencies. Students must also possess knowledge of equivalent fractions (4/16 = 2/8 = 1/4) and high levels of competency and familiarity in both proper fractions and mixed numbers. Finally, students must also possess the knowledge and skill ability of computing the equivalent decimal to equivalent fractional elements.

Another issue when using customary rulers is correctly reading and measuring the length of line segments or discrete side lengths of polygons. Competency in this measurement area takes much more practice than in the other areas of customary or metric measurement areas. However, this skill is definitely needed since the United States proposed a transition to the metric system from their standard customary units. However, the general public did not accept the 1975 Congressional mandate to change to the metric system main due to commercial purposes and general obstinacy of the American public. As of this writing in August, 2017, American highway road signs still provide distance measurements to upcoming cities and sites almost exclusively in standard customary units. Also, the building trades, construction and commercial industries still hold fast to their customary units over metric system units.

This measurement packet on customary measurement is intended for second semester fourth (4^{th}) grade to eighth (8^{th}) grade students. The advantages of student competency in using a ruler solidifies students' numeracy understanding in fractions, mixed numbers and decimals in the context of a practical methodology. Teachers should sequence the lessons in the order of the measurement packet; however, prerequisite math skills in basic math facts and computational skills, decimal conversions and equivalent fractions should be taught prior to using the lessons included in this measurement packet to ensure their students are adequately prepared academically.

A basic pedagogy is provided in Section 1 to assist entry-level teachers in the instruction of these lessons. I believe teachers would benefit from reading and considering fundamental pedagogical advice in this section. I have personally taught these lessons with 5^{th} grade students, and I have included teaching tips that I have found beneficial in teaching a classroom of students this measurement linear skill. It is my hope and intention that our instructional mistakes are not repeated by colleagues.

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UNDERSTANDING, READING & MEASURING USING A CUSTOMARY RULER

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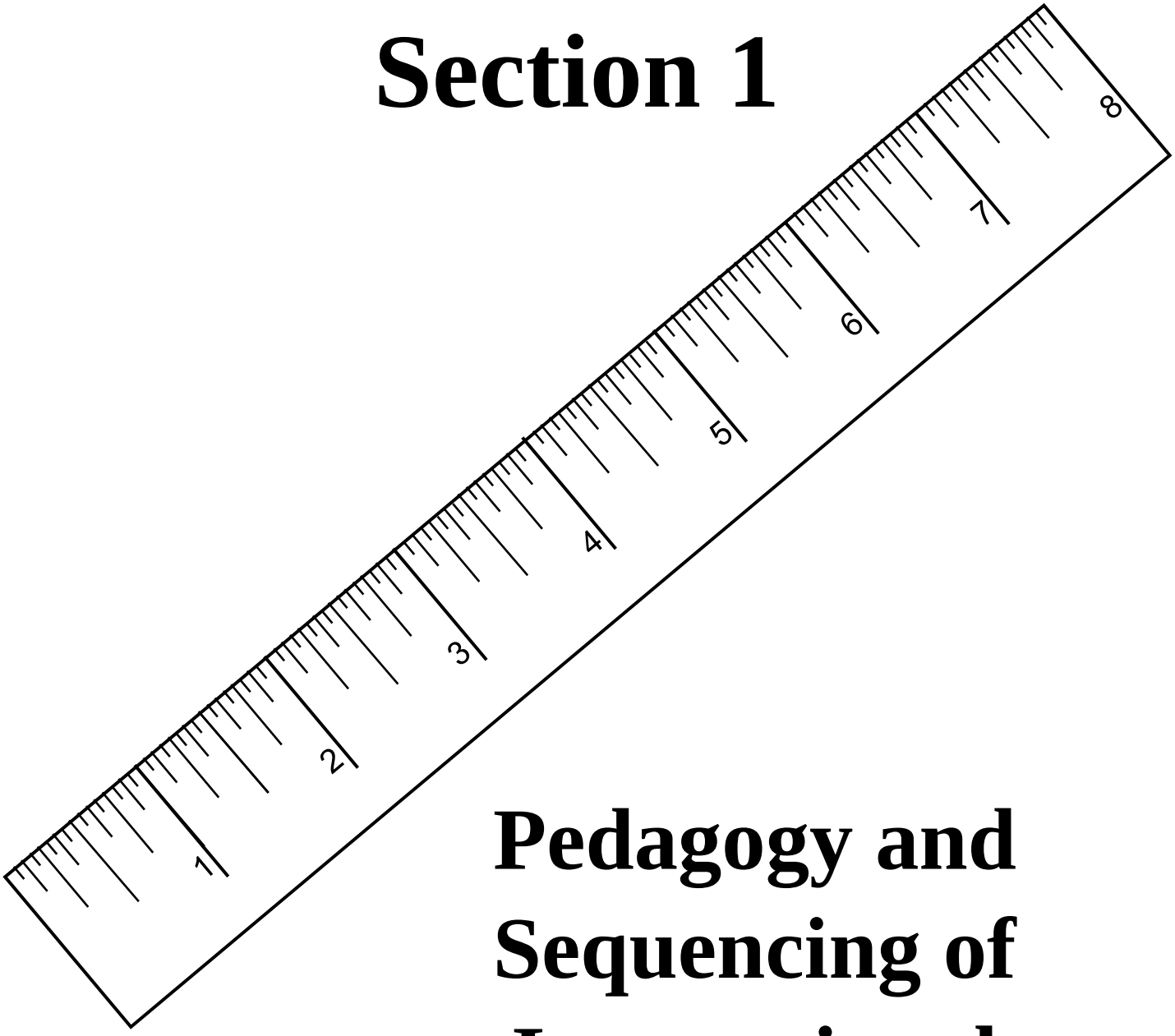
Section 1



Pedagogy and Sequencing of Instructional Unit

Section 1

Pedagogy and Sequencing of Customary Ruler Lessons

Section 2: Reproducible Rulers (Not to Scale)

This section provides rulers that are parsed in Halves, Quarters, Eighths, and Sixteenth inches. Using the overhead or document cameras, the teacher can show the breakdown of the rulers may use these rulers. A teacher is able to show the ruler and its equal spaces that demonstrates to students that a ruler is divided in a specific fractional element.

The section also is useful to show the equivalent fraction aspect of the ruler. From a vertical perspective, a student can readily view why 1/2 = 2/4 = 4/8 = 8/16. The teacher can show these mathematical equivalencies with students for all equivalent fractional elements that occur on the ruler. It is highly recommended that the teacher spend short mini lessons every day for 5 to 10 minutes until the students clearly understand and view that 1/4 = 2/8 = 4/16 and 3/4 = 6/8 = 12/16 as well as equivalencies for 1/8 = 2/16, etc. These short lessons familiarize students in an easily controlled and pedagogical setting where they can become familiar with the ruler and its composition. All too often it is overwhelming for many students to view an entire ruler parsed for the first time in either eighths or sixteenths. Small mini-lessons should be completed each day for a week to 7 class days with a duration of 5 to 10 minutes each day. During this time, students should repeat this exercise in guided instruction for BOTH the proper fraction (e.g. 1/4, 1/2 or 5/8, etc.) and mixed numbers (e.g. 2 1/2, 4 3/4, 5 2/8, etc.), and students will become very familiar with this important aspect of the ruler.

Note: A vertical (dashed) straight line connecting all the equivalent fractional elements between the different rulers on the same page greatly assists students in conceptual understanding. The students should label each mark on each ruler correctly with the equivalent fraction when completing this exercise.

Since the rulers provide a visual means of why proper fractions or mixed numbers are equivalent, it is important that the teacher stress the mathematical rational as well. The teacher can readily demonstrate that the mathematical reason underlying equivalent fractions is the identity property in mathematics – multiplying by 1 whole. For example, 1 whole = 2/2, 3/3, 4/4, 5/5, 6/6, 7/7, etc. to infinity. Hence, the only purely mathematical reason 1/2 = 4/8 is because the student is multiplying 1/2 by 1 whole (equal to 4/4, of course) and that product yields 4/8. The same can be shown for the special case of reducing or lowest terms of fraction. For example, 4/8 may be reduced to 1/2 via the identity property in mathematics. 4/8 is divided by 1 whole (equal, again, to 4/4) to obtain 1/2. Students will not understand this aspect of mathematics unless it is clearly explained to them. Once students view that they are really multiplying or dividing fractions (i.e. improper or proper) by 1 whole, the operation becomes intuitive to them from a mathematical sense on why equivalent fractions are, for lack of a better word, equivalent to one another.

These vertical reproducible rulers used in the manner described above afford students a fundamental basis and understanding of a customary ruler prior to actually using the customary ruler in either reading a specific measure or measuring a line or line segment.

Section 3: Labeling a Customary Ruler in both Decimals and Fractional Form

Please not that students still have not used a customary ruler to this point. The teacher is preparing the students for success in the near future when they do, slowly but surely. If students do not know possess the computational ability to convert proper fractions to decimals, short mini-lessons every day for a couple

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weeks (5 minutes per day) rectifies this skill deficiency. A couple problems at the beginning of a lesson each day, and they will be adept at that skill very rapidly. Of course, if students do readily know their math facts, this will be a hindrance in the process. After a few division iterations, most students rapidly realize that 1/2 = 0.5 and 1/4 = 0.25 every time. I recommend relating halves and quarters to money/coins, so they connect the knowledge to something they already know is true. The eighths are as far as a student needs to understand decimals. Once students understand equivalent fractions and fraction/decimal relationships, then the following logical mathematical pattern is readily understood: 1/8 = 0.125 and 2/8 = 1/4, then 3/8 is 1/4 = 0.25 + 1/8 = 0.125 for a total of 0.375, etc. It is recommended the teacher begin this process using 1/2 = 4/8 = 0.5, then 5/8 = 0.5 + 0.125 = 0.625. I was always surprised at the rapid speed students understand this equivalency and logic.

If the teacher spends short amounts of time on this exercise, slowly and consistently each day, the students understand the process and adapt to the customary ruler and it intricacies. I highly recommend after the students have sufficient exposure to these exercises, that the teacher send the exercise nightly with students for homework – and quickly review their work the following day. Students will reinforce this learning at home, and the teacher will be able to diagnostically assess if the students understand the process in a short period of time based on homework and subsequent daily classwork.

The **advantages** of engaging in these first two section's activities are the following:

1.) Students are provided background knowledge on the customary ruler prior to using one.
2.) The process is discrete and highly time effective in the form of short mini lessons using an effective 'Spaced Repetition System' each day.
3.) The teacher can control the process for all students – ensuring all students experience success with the activity and familiarity with important mathematical concepts used later during applications.
4.) Students become familiar with equivalent fractions, equivalent decimal and proper fractions and a fractional number line in an authentic example – a customary ruler.

Section 4: Reading a Customary Ruler from Halve to Sixteenths

Students can correctly learn to read a customary ruler in stages, as needed, in a controlled setting – starting with the halves and gradually progressing toward the sixteenths. I recommend teachers begin the process showing students 'halves' and stress the equivalent fractions 1/2 = 2/4 = 4/8 = 8/16. In doing so, the student can read dimensions of 3/8, 7/16, 9/16 and 5/8 very rapidly by increasing or decreasing the desired fractional elements of 1/8 and 1/16. After that skill is mastered, the teacher can repeat the process for 1/4 and 3/4. Students learn very quickly to use the main quarter marks of a ruler based on the equivalencies of 1/4, 1/2 and 3/4, and a customary ruler is clearly understood from both an effective and efficiency perspective. Finally, students should use the same logic with the proper fraction, 15/16. Students must realize that the next whole number, for example, is 3 or 2 16/16. Hence, one tick mark back on the sixteenths (1/16) measurement accuracy must yield 2 15/16. I have found students enjoy this fractional understanding, and it is extremely useful from a numeracy perspective when students learn to add and subtract proper and improper fractions.

There are sufficient practice sheets for teachers to teach students in quick and consistent mini lessons (e.g. spaced repetition system methodology) and reinforce the daily work with nightly homework in conjunction with their normal nightly core lesson work. Again, note that the student has still not worked physically with a customary ruler. When the students pick up a ruler for the first time, they will be sufficiently skilled in background knowledge, so the task does not appear overwhelming with so many mathematical and skills crammed into an initial lesson on reading and measuring using a customary ruler).

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Section 5: Measuring with a Customary Ruler from Halve to Sixteenths

Time for the real thing…using a customary ruler. The teacher should visually check all the rulers that students will be using to ensure that they are in good, readable condition. It is best if all students have the exact same model of a customary ruler. It will make it easier if there are NOT small differences in the ruler manufacturers.

An important instructional tip to students is the importance of lining the ruler end point at the zero (0) mark and that the customary ruler is parallel to the line being measured. In doing so, then students may only concentrate on reading the customary ruler correctly. The teacher should model this process – talking aloud to communicate their thinking to the whole class during the direct teach AND the first examples of guided practice – prior to the students measuring independently. There are sufficient sheets to repeat this exercise. If all practice versions are completed, reuse the practice sheets. Generally speaking, students do not remember the measurement answers or the teacher can quickly create their own sheets, as needed.

If teaching 5th grader students or higher, it is highly probable that there are as many as thirty (30) or more students in the classroom, but there is only one (1) classroom teacher. I discovered that I could 'pretrain' 5 to 6 of the best mathematics' students in a small group setting until they have mastered the measuring process. Consequently, now the teacher has as many as 6 or 7 'teachers' in the classroom to assist the remainder of the students. The teacher should choose students that are competent math students and empathetic to other students – meaning there need to be consistent rules and expectations of student to student dialogue and engagement. This instructional aspect is highlighted when using student helpers due to the fact that I have selected a student in the past that was not polite to his peers when assisting them with their customary ruler measurement work. However, when I provided not only clear instruction on the proper means to use the customary ruler as well as proper interaction with their peers, I did not experience a reoccurrence these issues.

An extension of the above exercises after student mastery of reading and measuring using a customary ruler is CREATING a line of some desired length. This is an extremely important skill to master as well. I recommend using the same student helper technique as before to provide the teacher with as many as 5 to 6 competent student helpers to quickly check student's work and assist them as needed.

Section 6: Measuring with a Customary Ruler to Compute Perimeter and Area – Application

Students must possess background knowledge in changing mixed number or mixed fractions to improper fractions. The will also need prerequisite skills in adding and multiplying proper and improper fractions as well as skill prowess in reducing fractions to their simplest or lowest terms, and understand the mathematical meanings of perimeter and area with polygons.

It is highly recommended the teacher model this activity with the class sufficiently for both direct teach and guided practice – speaking aloud to communicate the exact thinking process to the students. Again, I recommend using the 5 or 6 student helpers as before, so the lesson can be completed quickly during the independent practice and all students are receiving competent assistance. The teacher can work with the students that academically struggle the most in these areas.

Note: The classroom teacher can skip some of the sections if she feels her students have the necessary understanding to move through the lessons at a quickened pace. However, I would caution the teacher. When I have done this in the past, I have discovered as many as 35 percent of my students struggle with understanding in this section - application skills. Hence, the initial lessons can be completed in short 5 to 10 minute lessons each day and that time investment reaps dividends during the application and measurement work.

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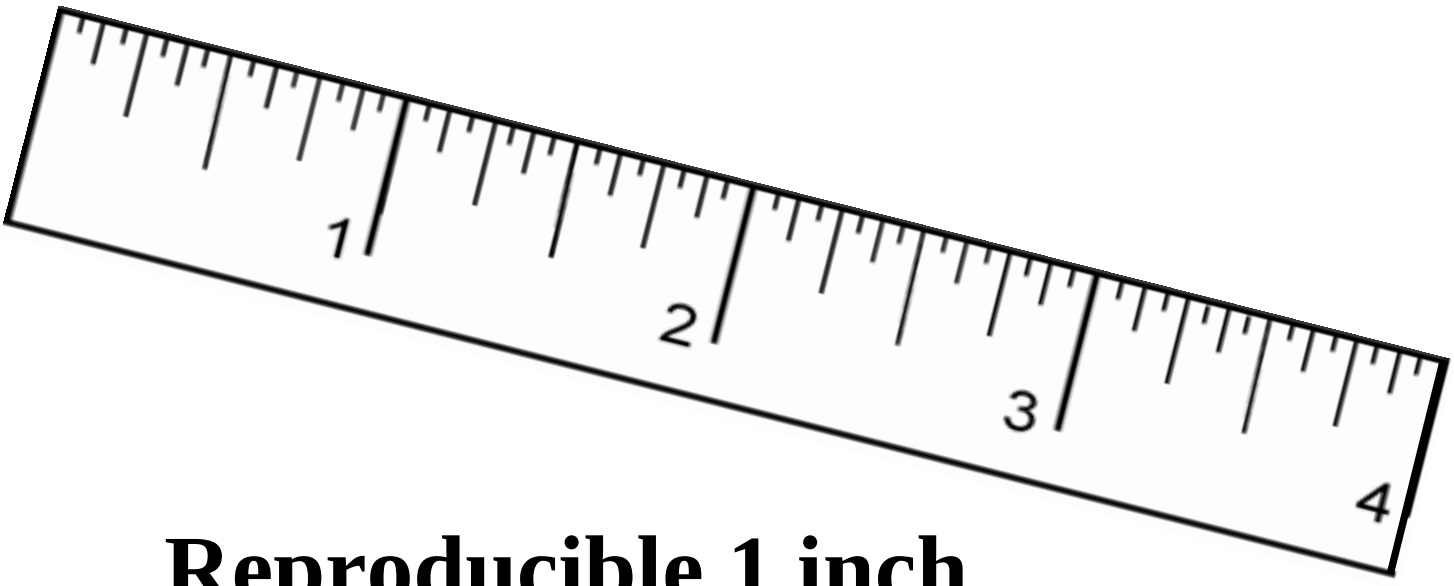
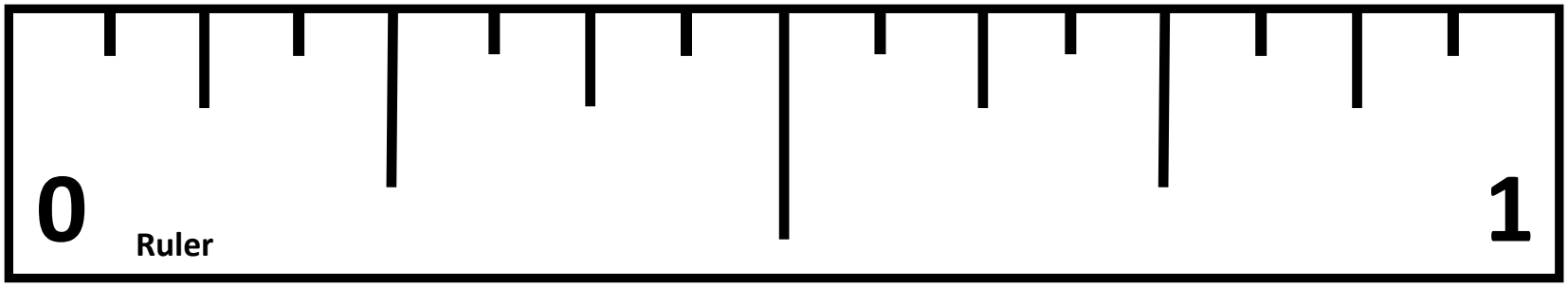
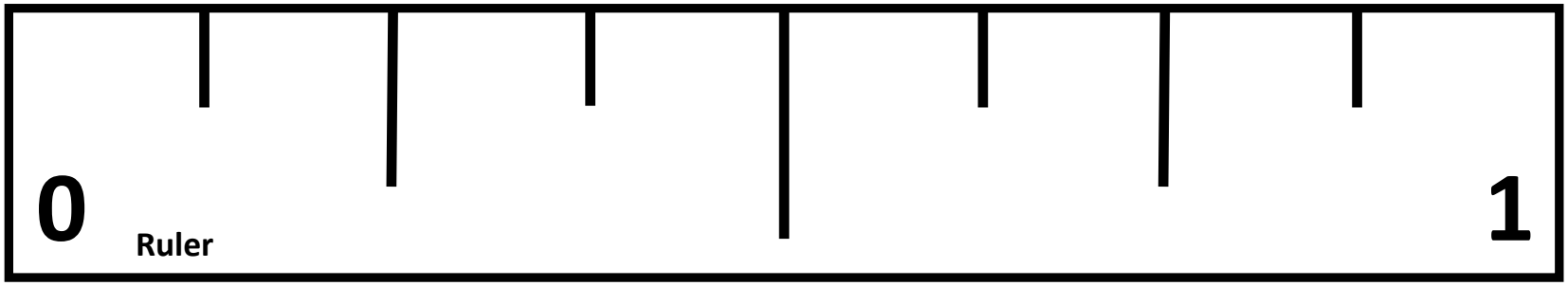
Section 2

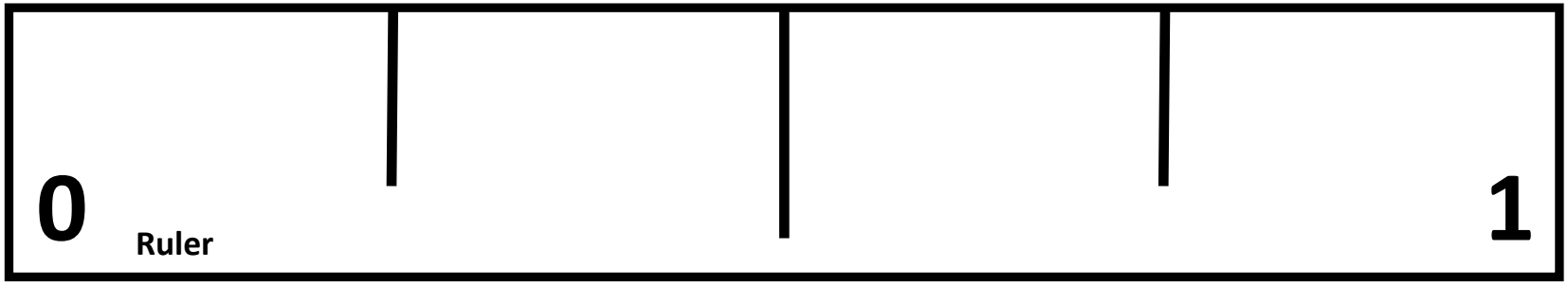


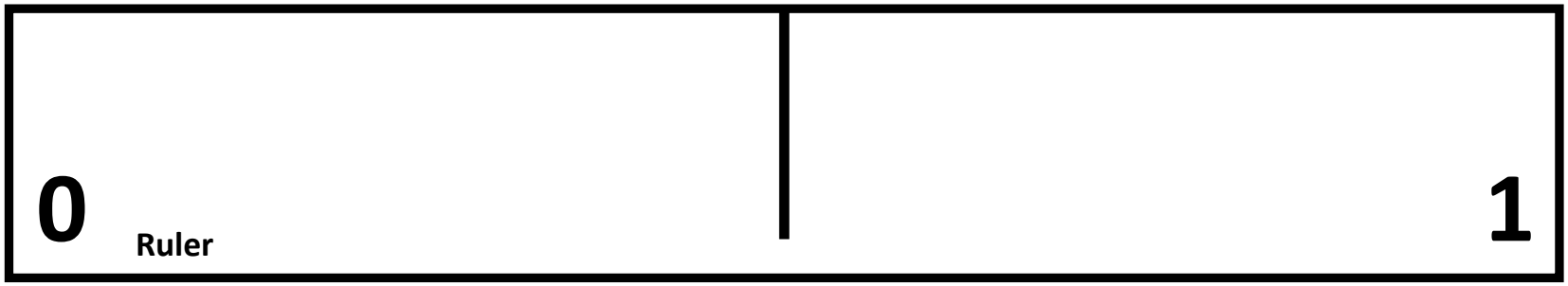
Reproducible 1 inch, 2 inch, 4 inch and 8 inch Customary Rulers EACH parsed in Halves, Quarters, Eighths and Sixteenths. – Not to Scale.

Customary Ruler Models – to 1 Inch – Version 1









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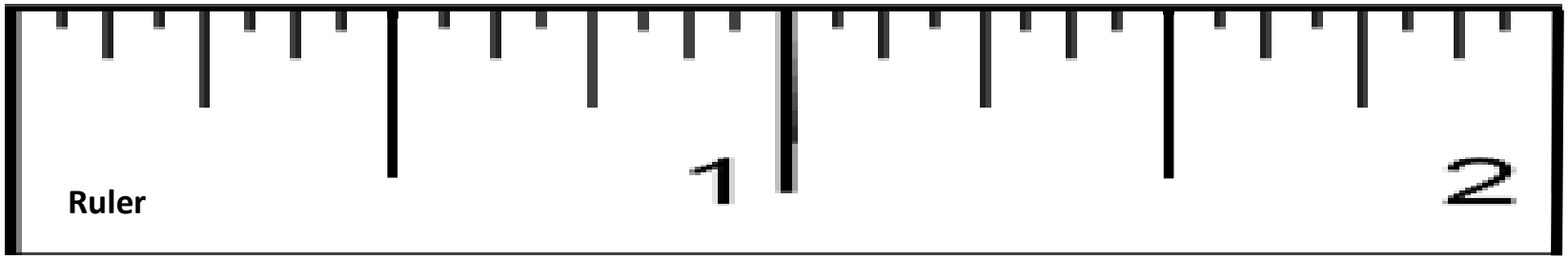
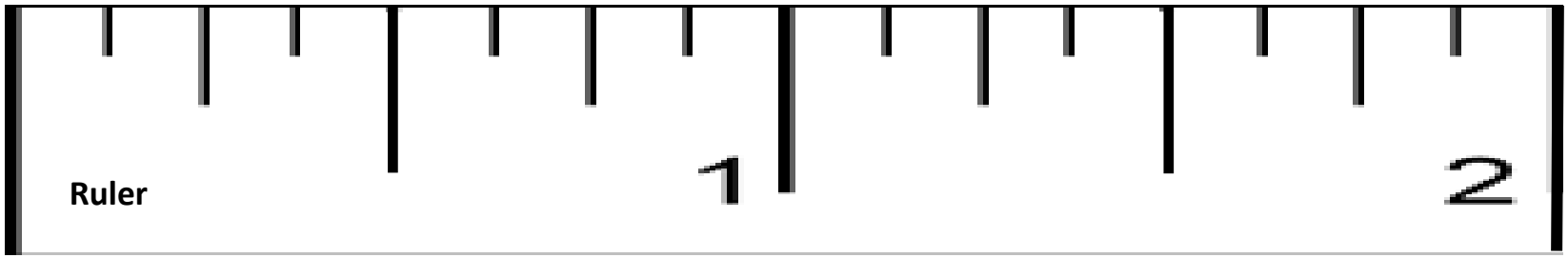
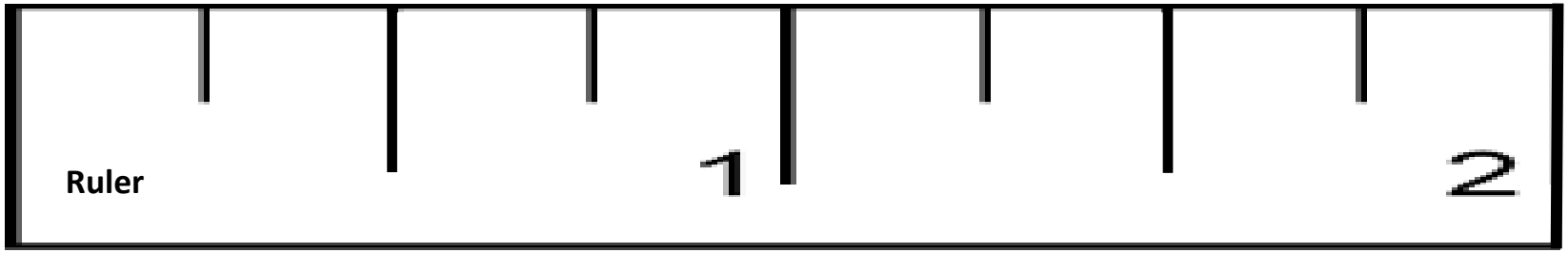
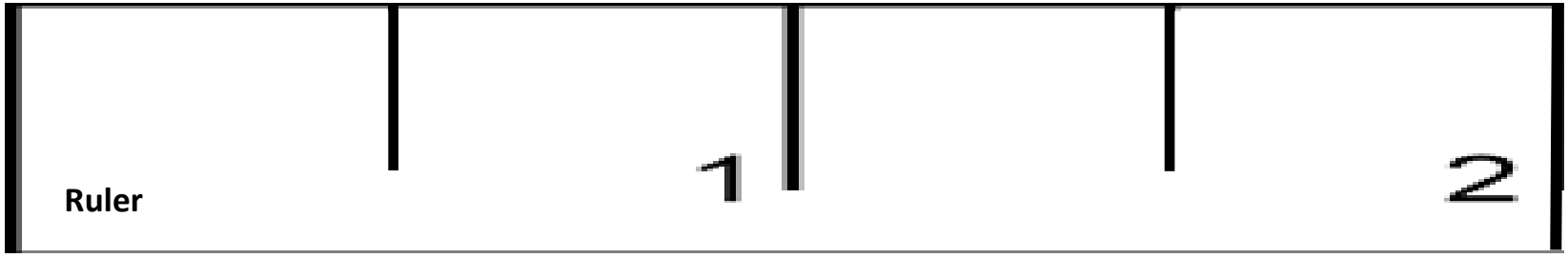
Customary Ruler Models – to 2 Inches – Version 2









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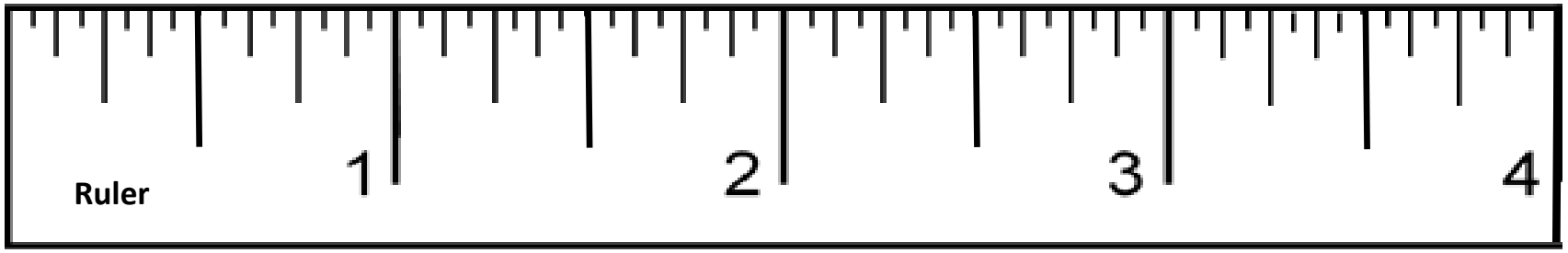
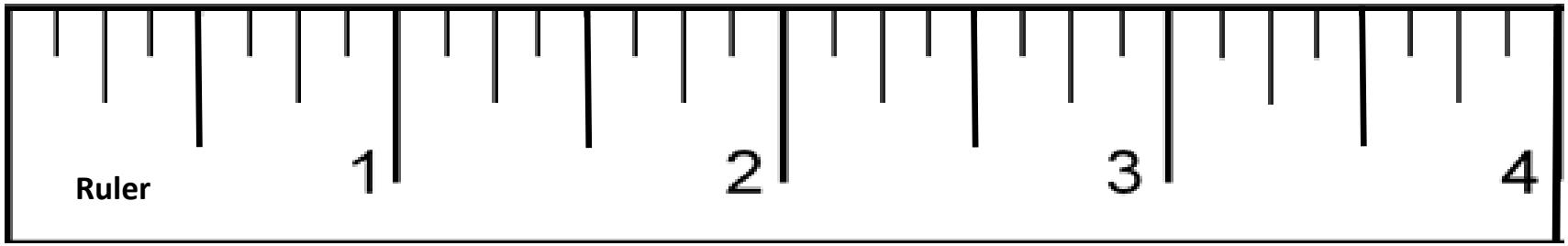
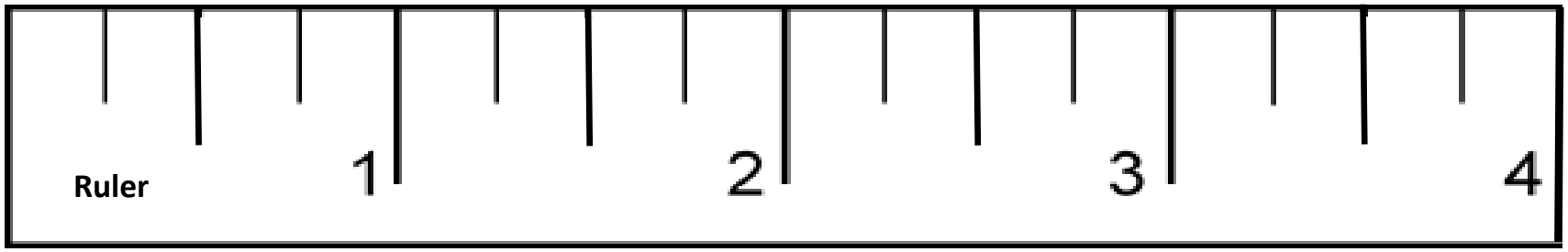
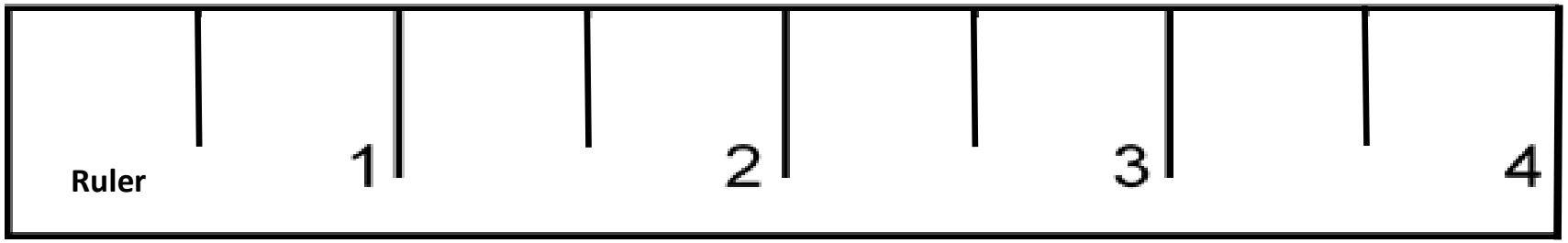
Customary Ruler Models – to 4 Inches – Version 3









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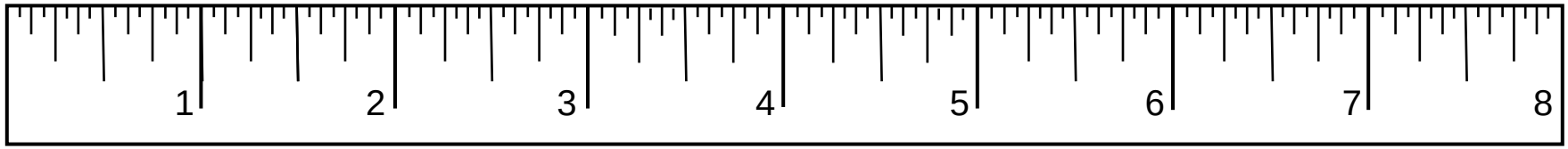
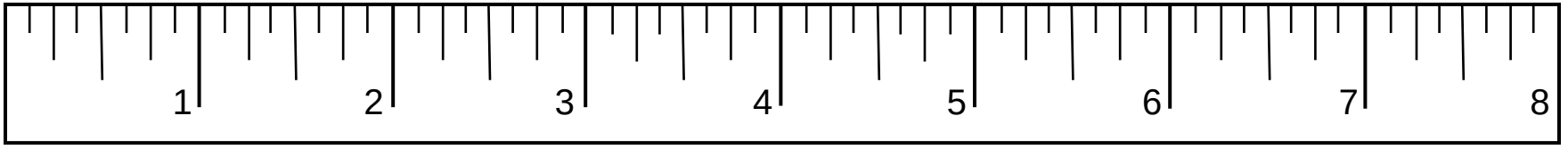
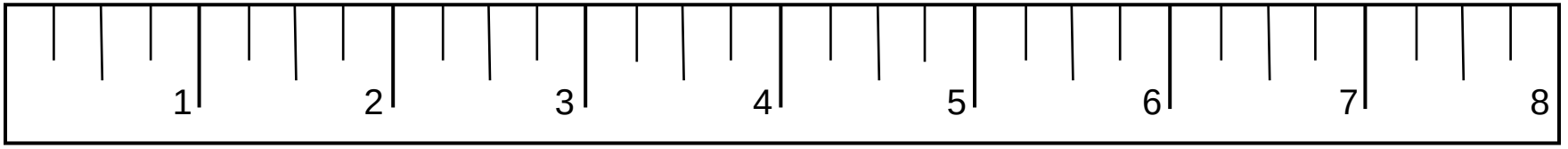
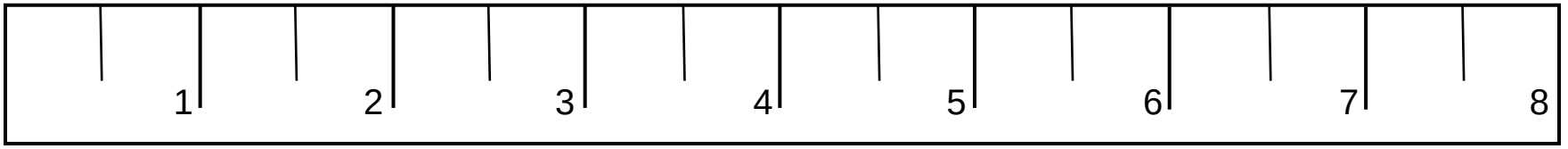
Customary Ruler Models – to 8 Inches – Version 4









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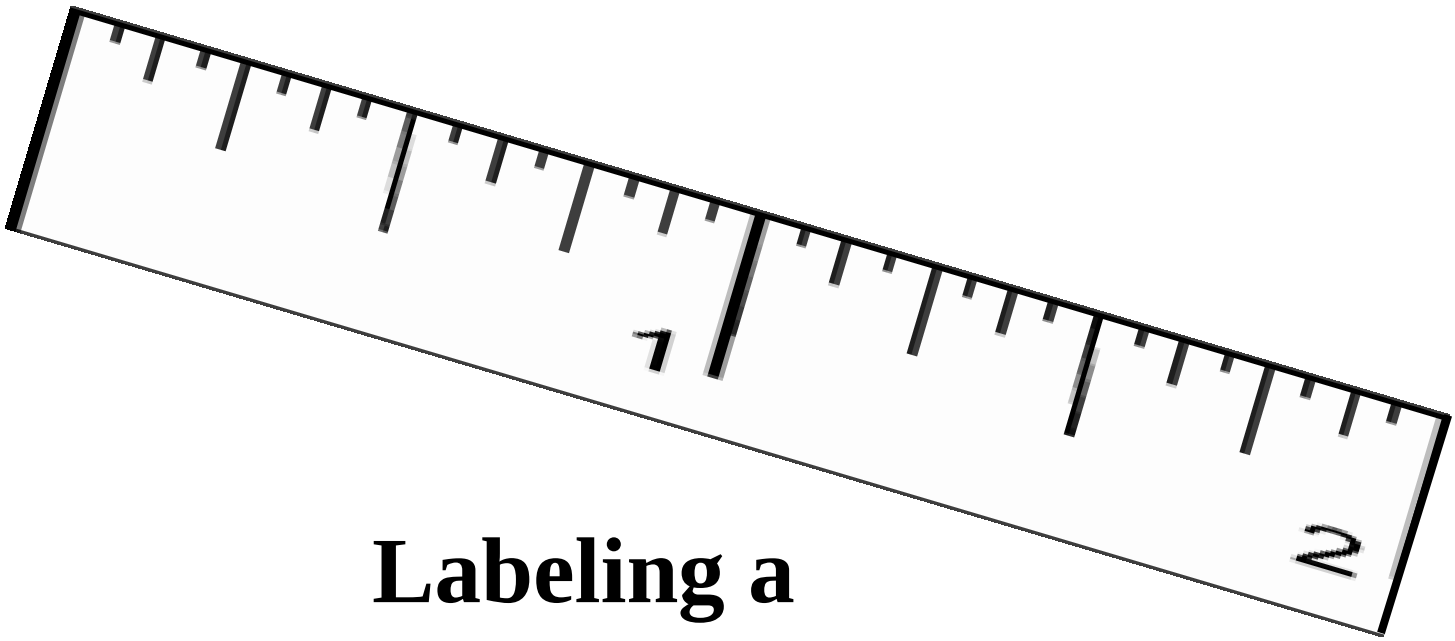
Section 3



Labeling a Customary Ruler in Halves, Quarters, Eighths and Sixteenths in Fraction and Mixed Number with Equivalent Decimals

Section 3

Labeling a Ruler

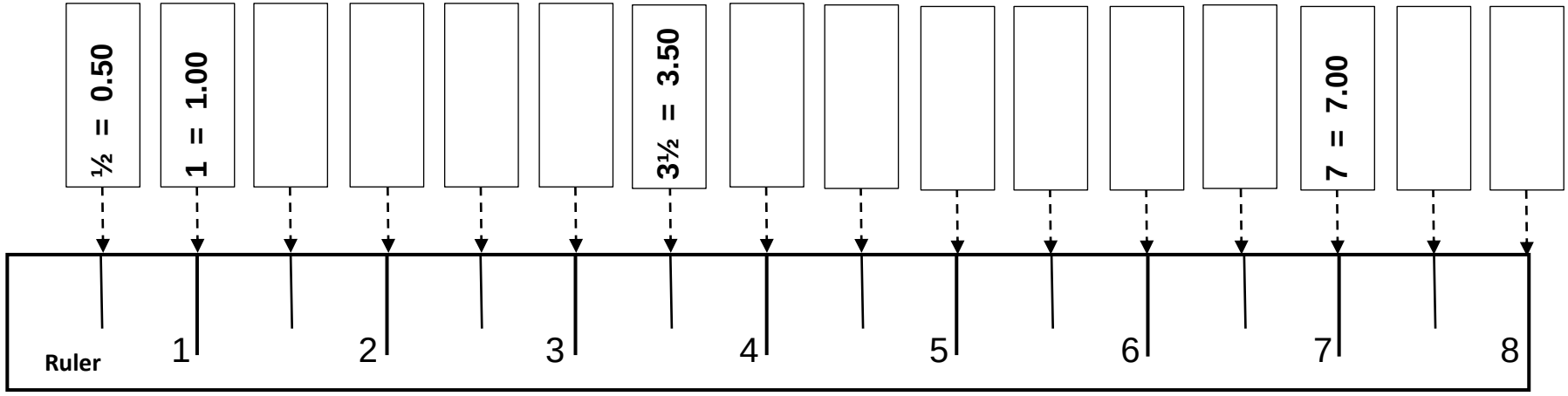
Halves

8 inch Ruler

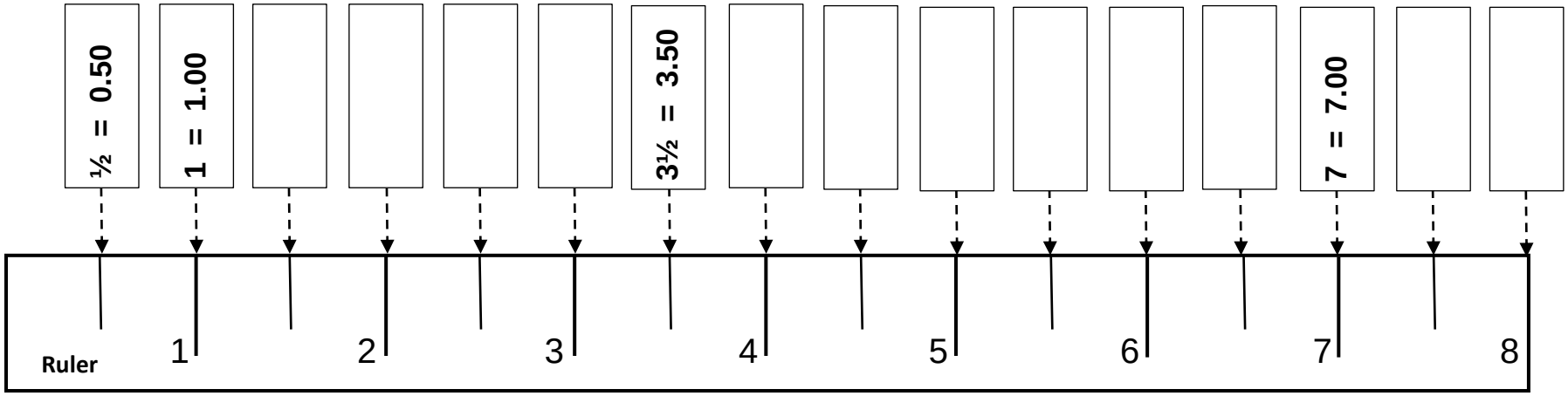
(Proper Fractions, Mixed Numbers and Equivalent Decimals)

Learning to Read A Customary Ruler - Halves

Directions: **Fill out the rectangle with the proper fraction equal to its decimal equivalent where the arrow points on the Ruler.**
Example: 1/2 = 0.50 and 3 ½ = 3.50



Directions: **Fill out the rectangle with the proper fraction equal to its decimal equivalent where the arrow points on the Ruler.**
Example: 1/2 = 0.50 and 3 ½ = 3.50



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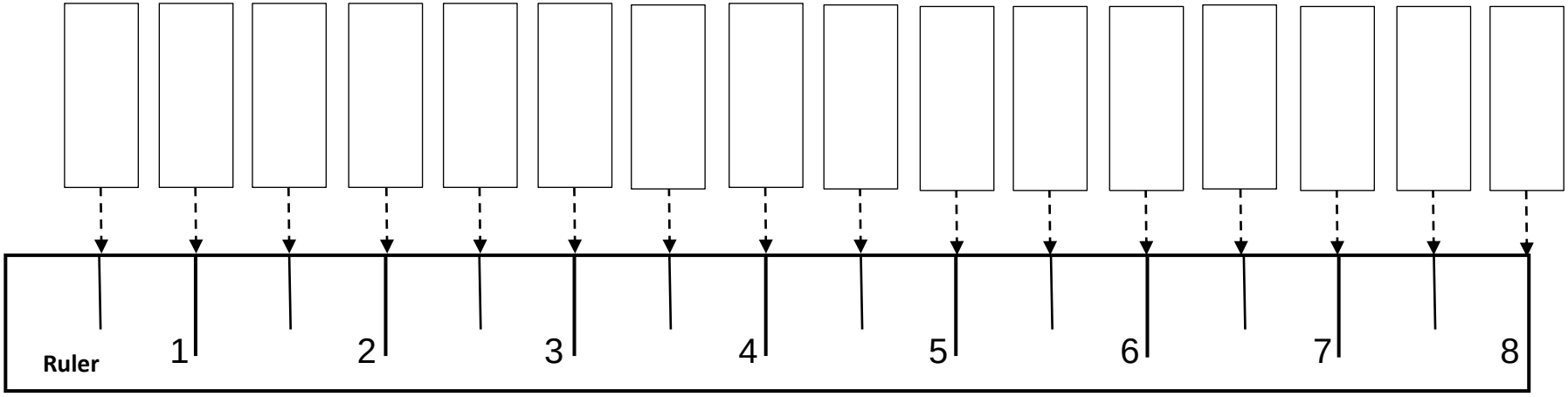
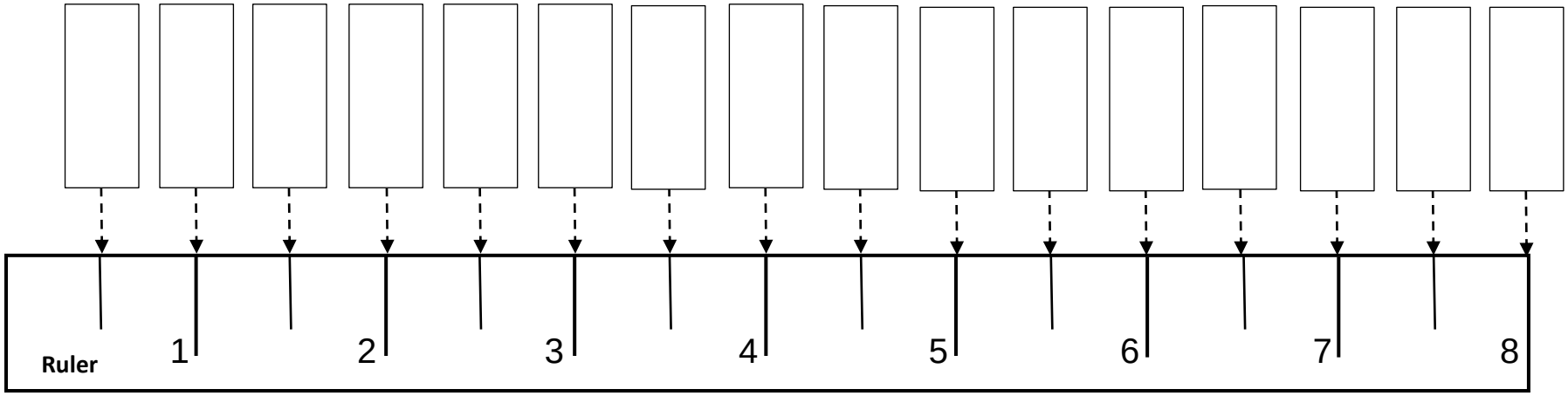
Learning to Read A Customary Ruler - Halves

Directions: **Fill out the rectangle with the proper fraction equal to its decimal equivalent where the arrow points on the Ruler.**
Example: 1/2 = 0.50 and 3 ½ = 3.50



Directions: **Fill out the rectangle with the proper fraction equal to its decimal equivalent where the arrow points on the Ruler.**
Example: 1/2 = 0.50 and 3 ½ = 3.50



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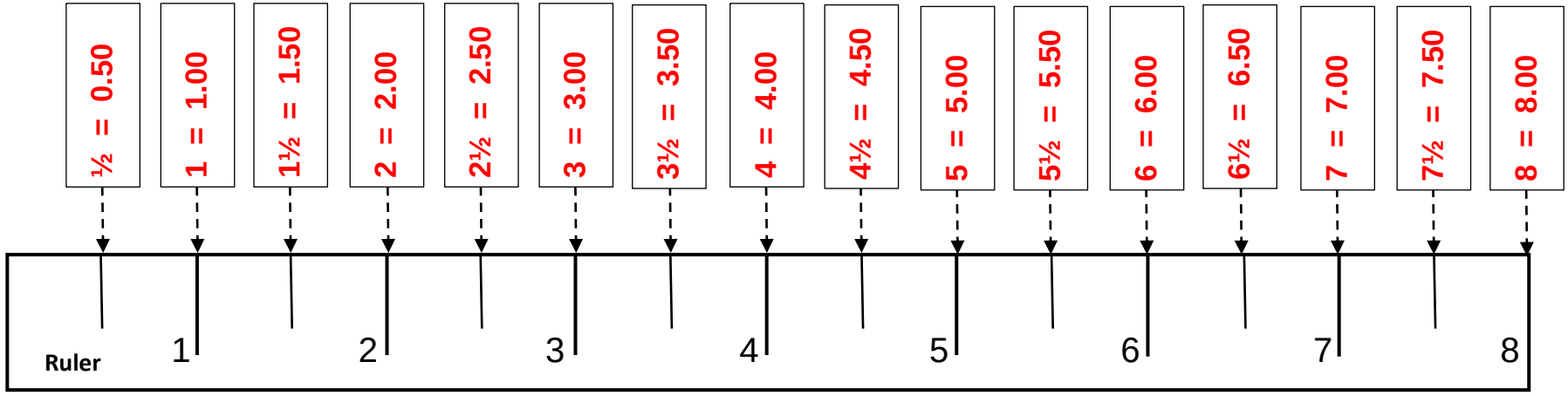
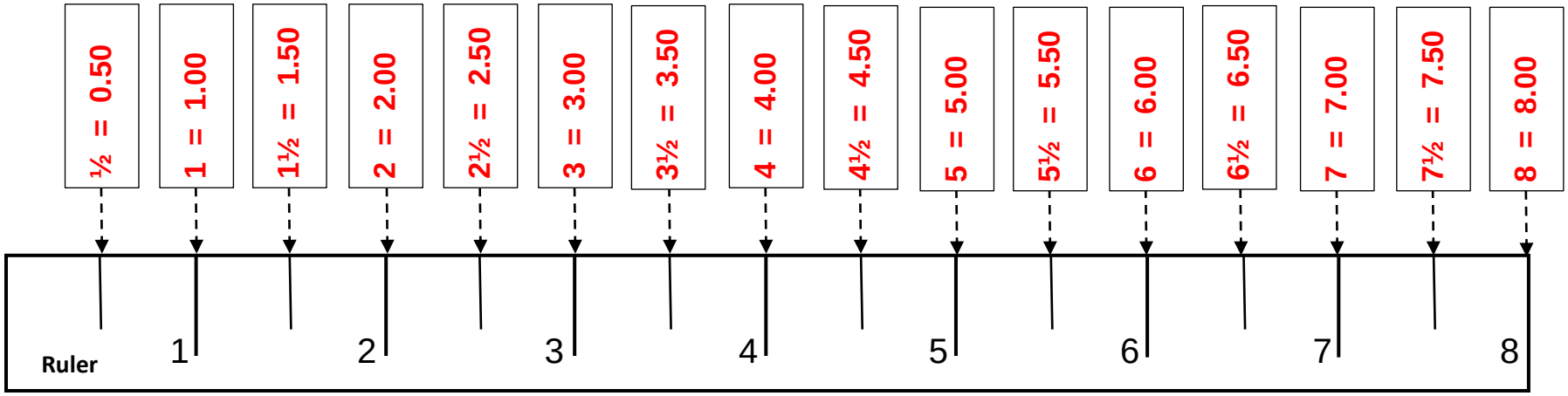
Learning to Read A Customary Ruler - Halves

Directions: **Fill out the rectangle with the proper fraction equal to its decimal equivalent where the arrow points on the Ruler.**
Example: 1/2 = 0.50 and 3 ½ = 3.50



Directions: **Fill out the rectangle with the proper fraction equal to its decimal equivalent where the arrow points on the Ruler.**
Example: 1/2 = 0.50 and 3 ½ = 3.50



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Section 3

Labeling a Ruler

Quarters

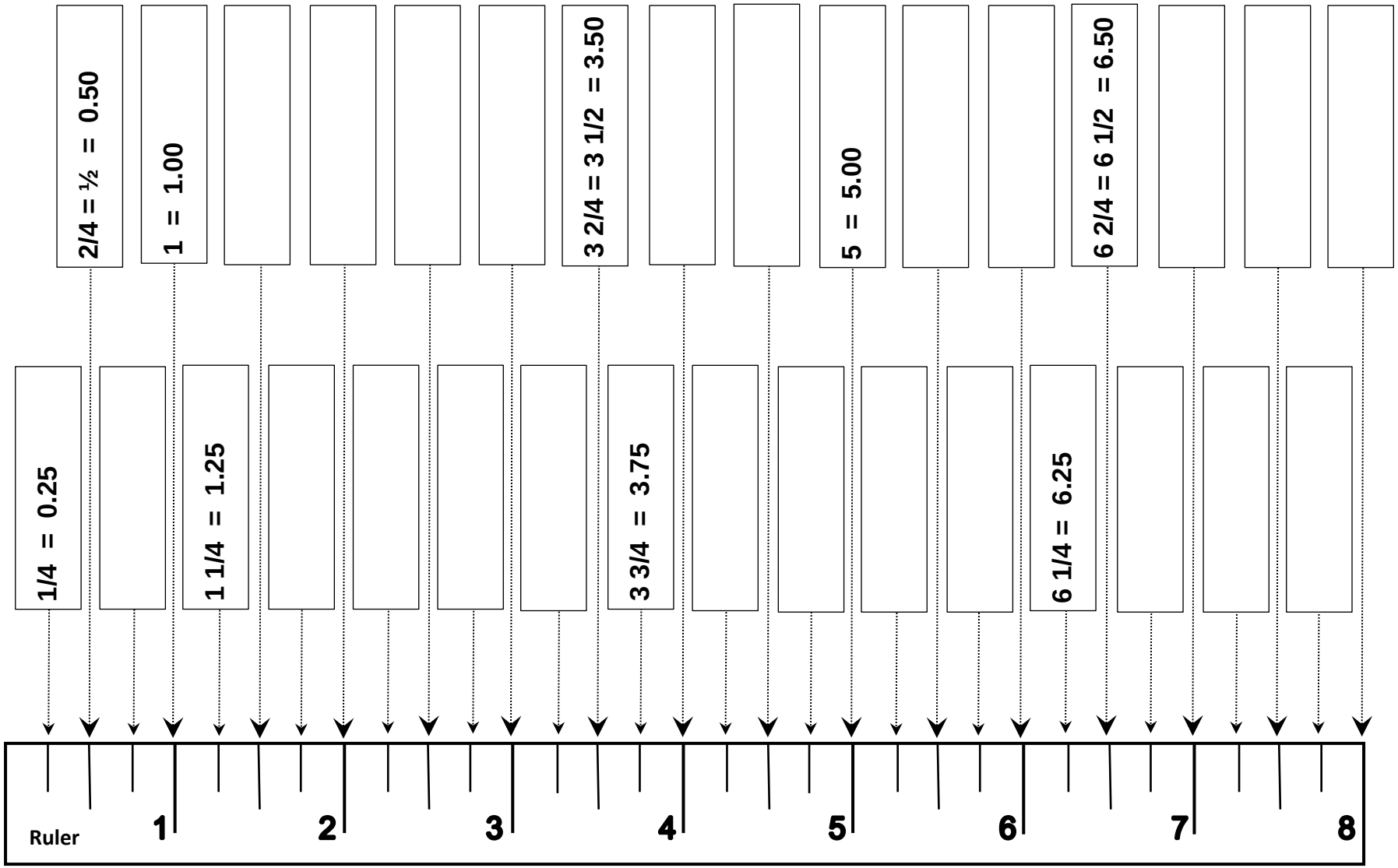
8 inch Ruler

(Proper Fractions, Mixed Numbers and Equivalent Decimals)

Learning to Read A Customary Ruler - Quarters

Directions: **Fill out the rectangle with the proper fraction equal to its decimal equivalent where the arrow points on the Ruler.**

Example: 2/4 = 1/2 = 0.50 and 3 2/4 = 3 1/2 = 3.50



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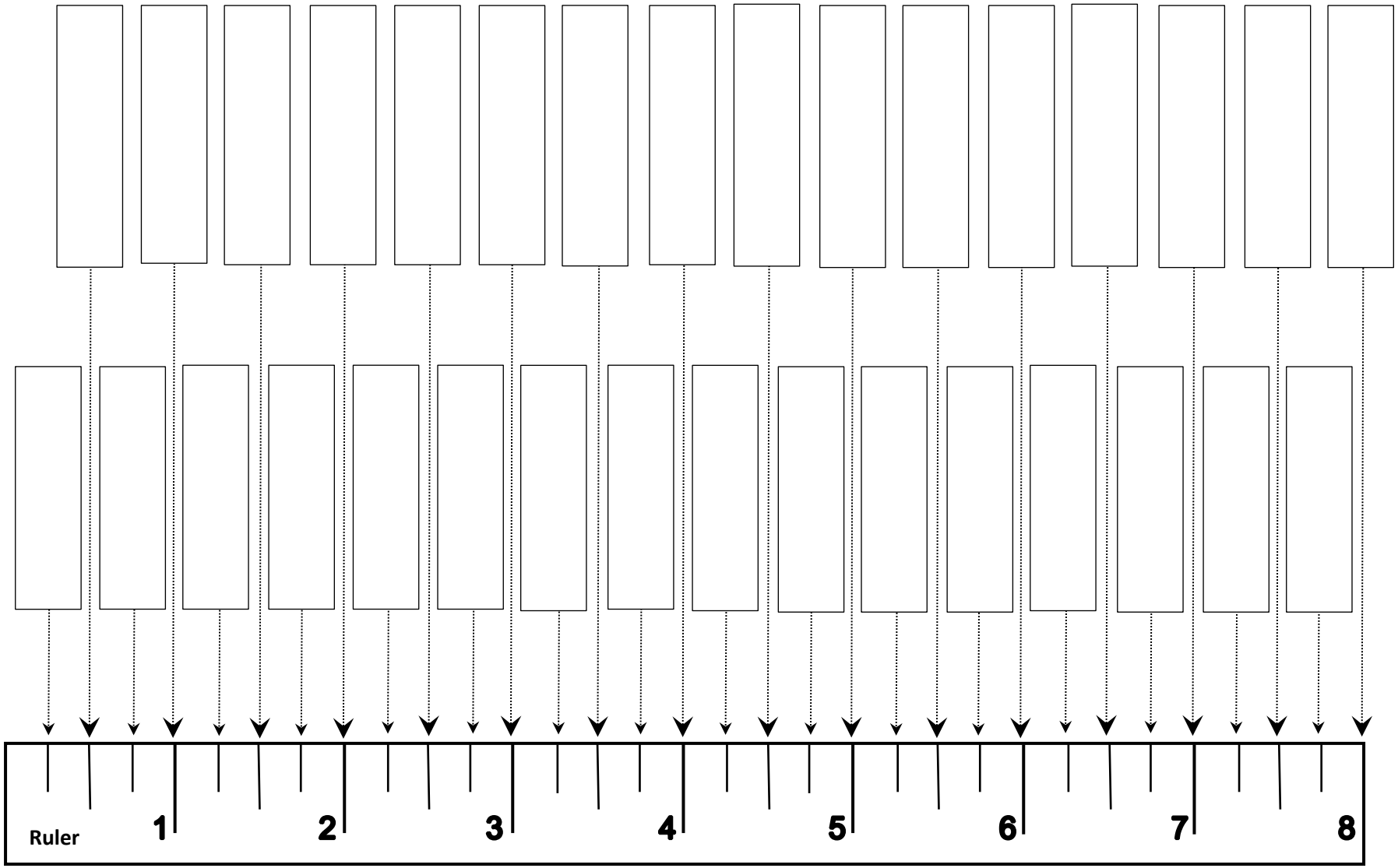
Learning to Read A Customary Ruler - Quarters

Directions: **Fill out the rectangle with the proper fraction equal to its decimal equivalent where the arrow points on the Ruler.**

Example: 2/4 = 1/2 = 0.50 and 3 2/4 = 3 1/2 = 3.50



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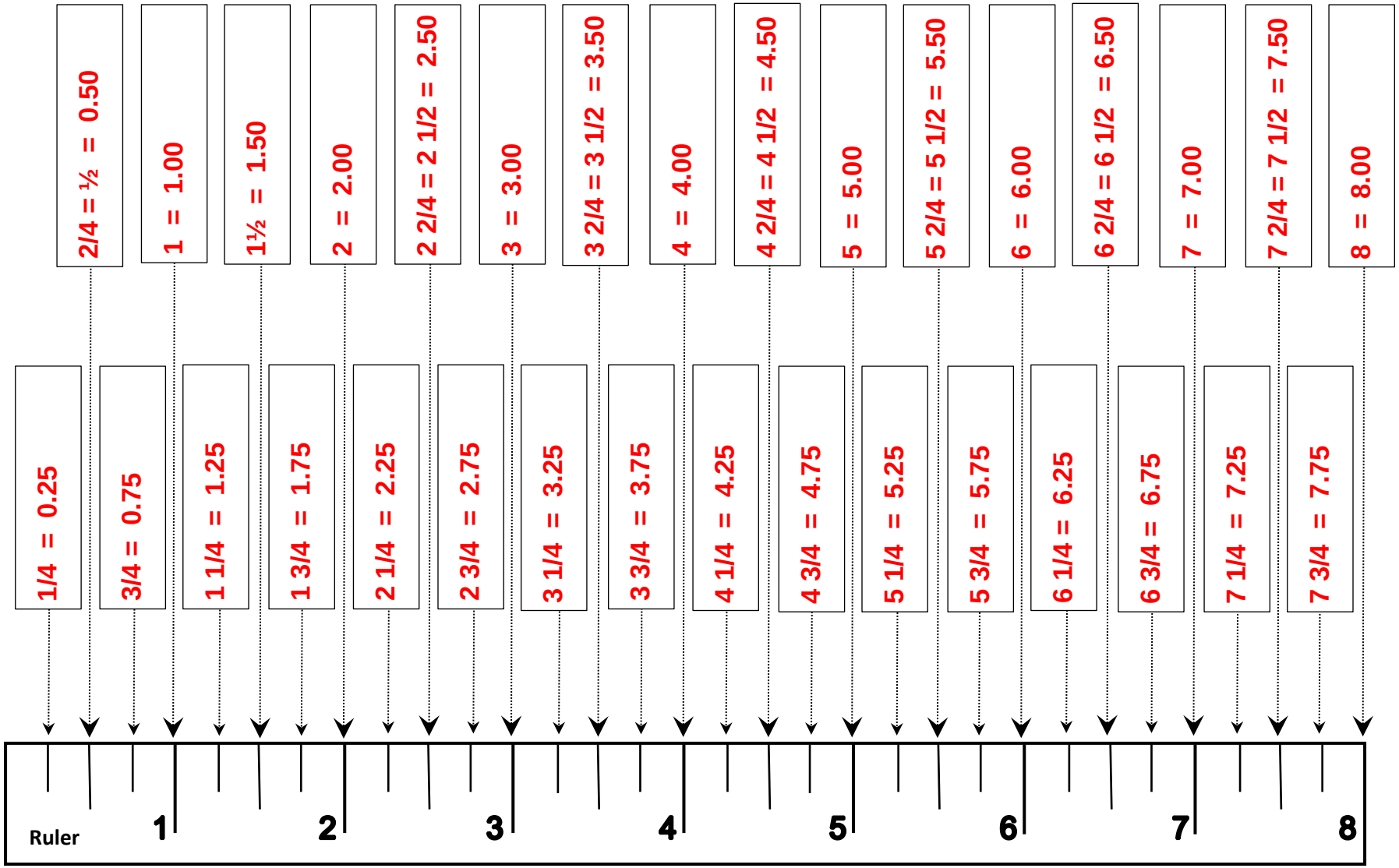
Learning to Read A Customary Ruler - Quarters

Directions: **Fill out the rectangle with the proper fraction equal to its decimal equivalent where the arrow points on the Ruler.**

Example: 2/4 = 1/2 = 0.50 and 3 2/4 = 3 1/2 = 3.50



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Section 3

Labeling a Ruler

Eighths

2 inch Ruler

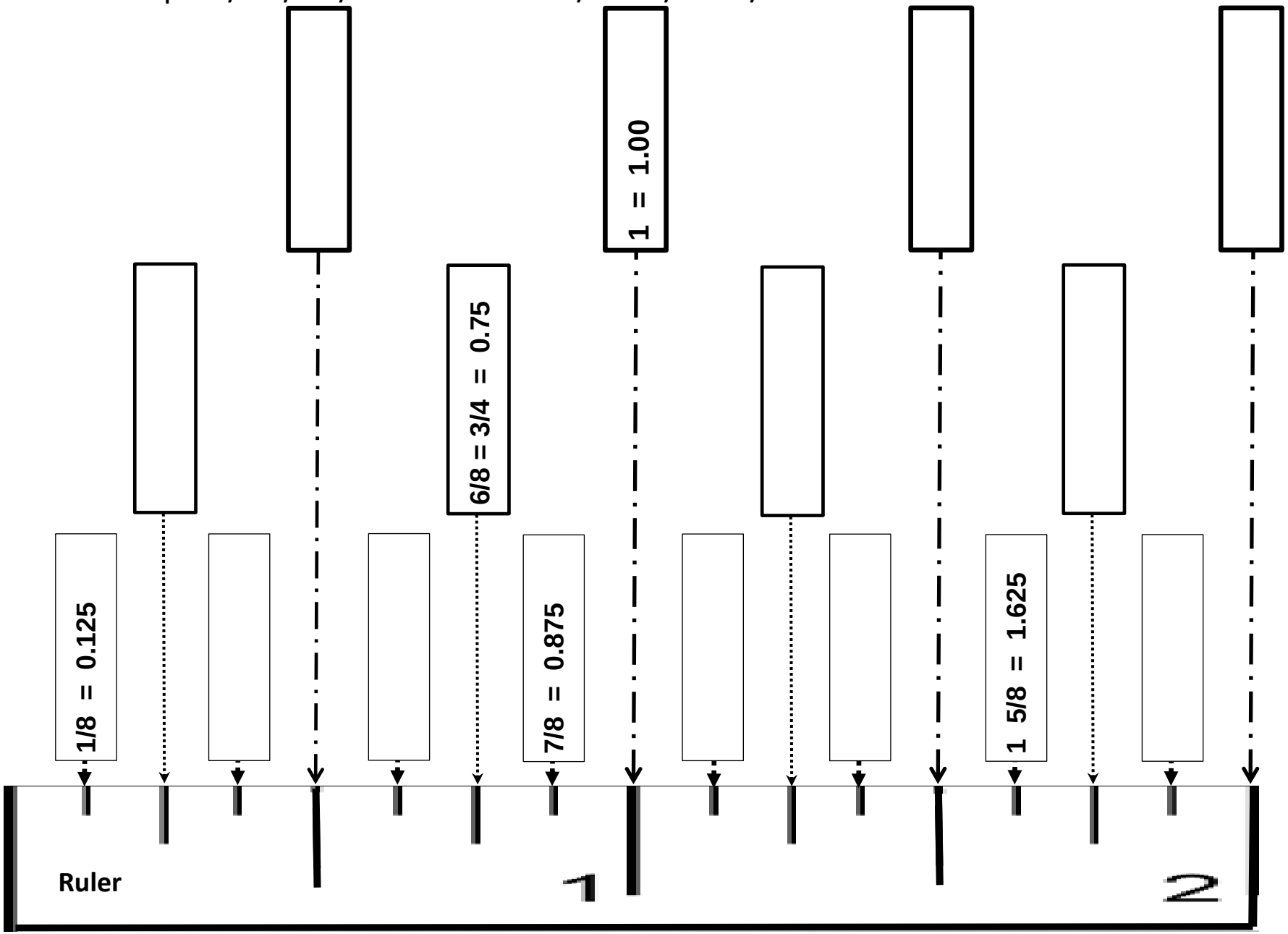
4 inch Ruler

(Proper Fractions, Mixed Numbers and Equivalent Decimals)

Learning to Read A Customary Ruler - Eighths

Directions: **Fill out the rectangle with the proper fraction equal to its decimal equivalent where the arrow points on the Ruler.**

Example: 4/8 = 2/4 = 1/2 = 0.50 and 3 4/8 = 3 2/4 = 3 1/2 = 3.50



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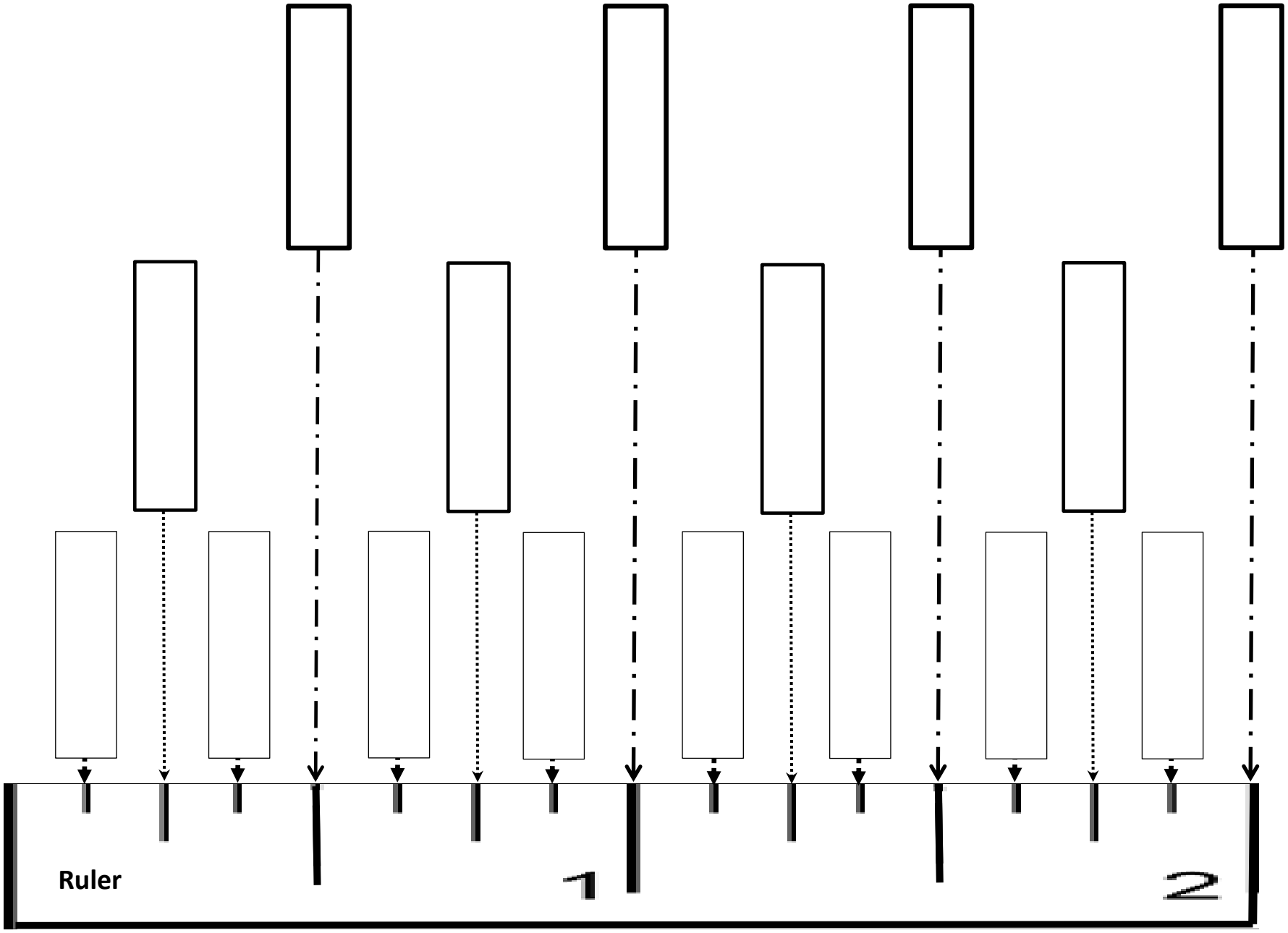
Learning to Read A Customary Ruler - Eighths

Directions: **Fill out the rectangle with the proper fraction equal to its decimal equivalent where the arrow points on the Ruler.**

Example: 4/8 = 2/4 = 1/2 = 0.50 and 3 4/8 = 3 2/4 = 3 1/2 = 3.50



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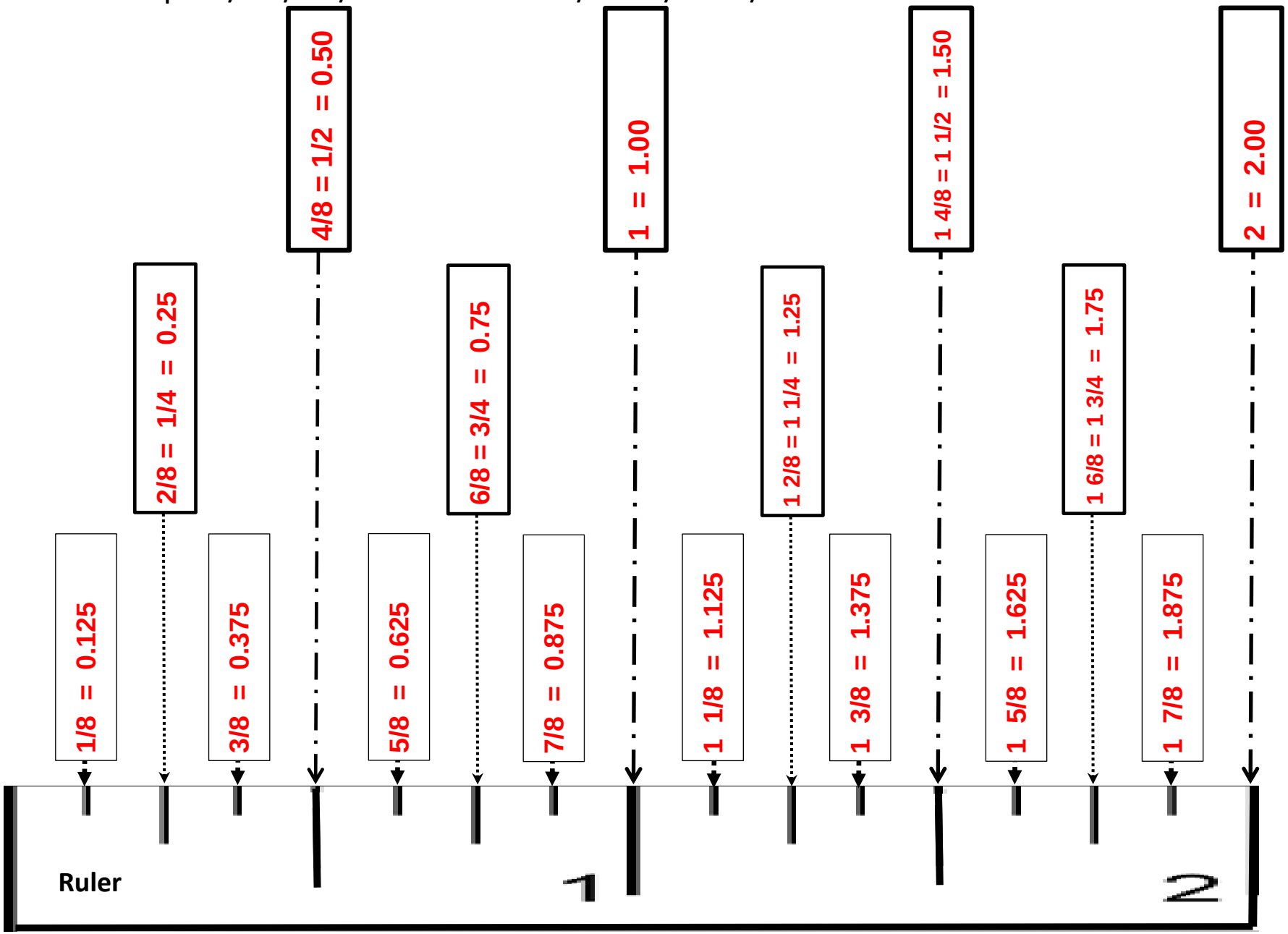
Learning to Read A Customary Ruler - Eighths

Directions: **Fill out the rectangle with the proper fraction equal to its decimal equivalent where the arrow points on the Ruler.**

Example: 4/8 = 2/4 = 1/2 = 0.50 and 3 4/8 = 3 2/4 = 3 1/2 = 3.50



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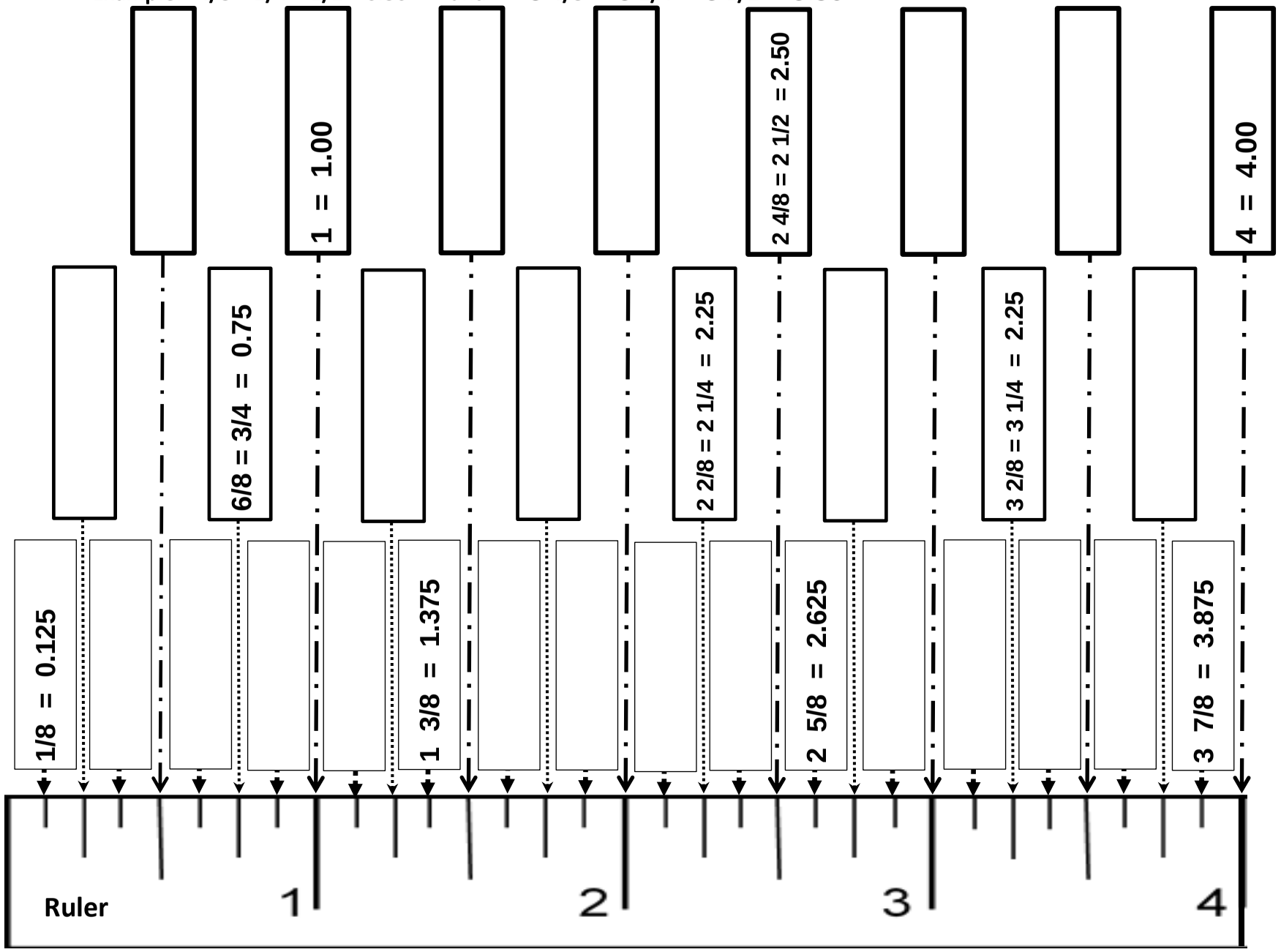
Learning to Read A Customary Ruler - Eighths

Directions: **Fill out the rectangle with the proper fraction equal to its decimal equivalent where the arrow points on the Ruler.**

Example: 4/8 = 2/4 = 1/2 = 0.50 and 3 4/8 = 3 2/4 = 3 1/2 = 3.50



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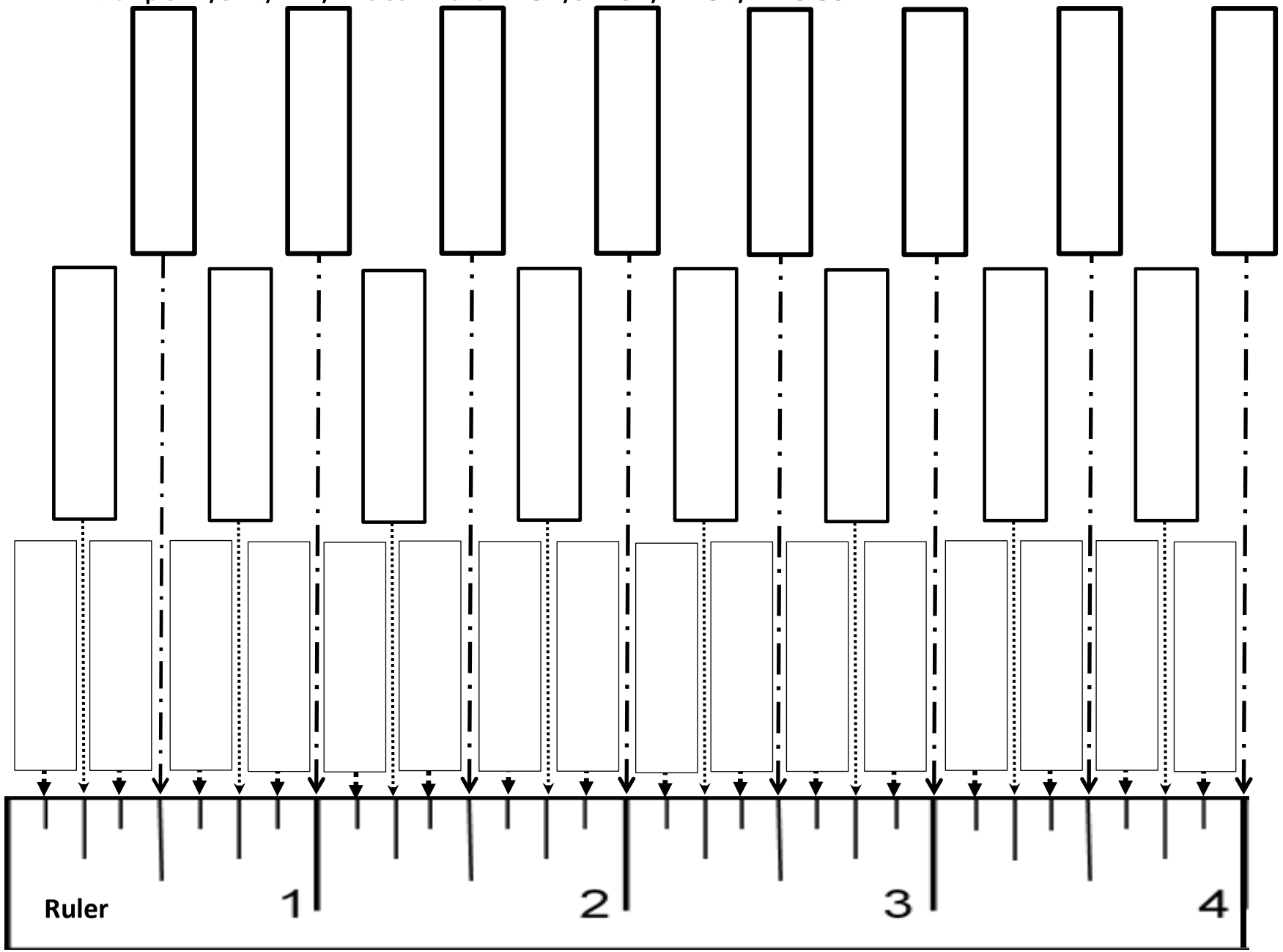
Learning to Read A Customary Ruler - Eighths

Directions: **Fill out the rectangle with the proper fraction equal to its decimal equivalent where the arrow points on the Ruler.**

Example: 4/8 = 2/4 = 1/2 = 0.50 and 3 4/8 = 3 2/4 = 3 1/2 = 3.50



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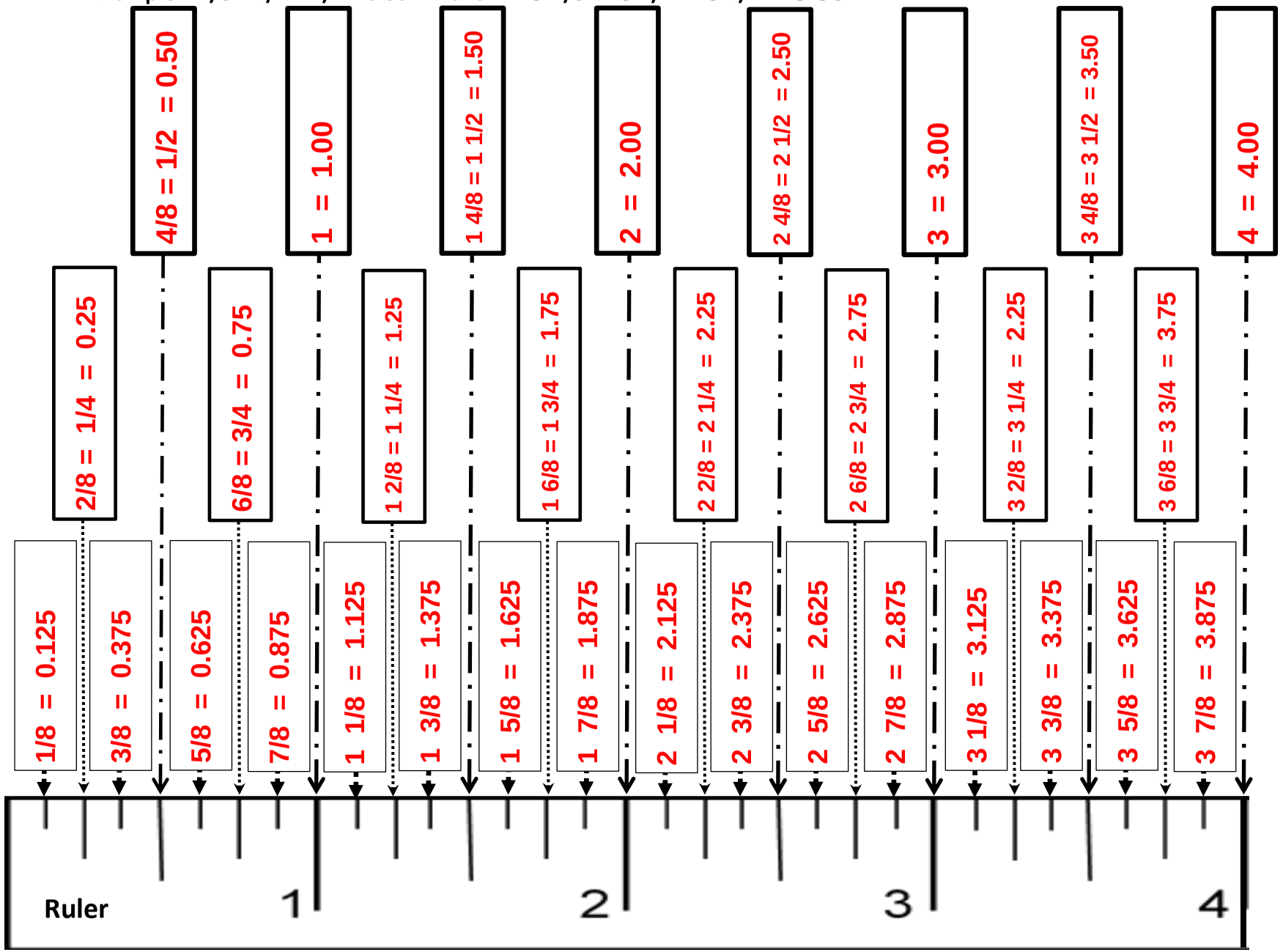
Learning to Read A Customary Ruler - Eighths

Directions: **Fill out the rectangle with the proper fraction equal to its decimal equivalent where the arrow points on the Ruler.**

Example: 4/8 = 2/4 = 1/2 = 0.50 and 3 4/8 = 3 2/4 = 3 1/2 = 3.50



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Section 3

Labeling a Ruler

Sixteenths

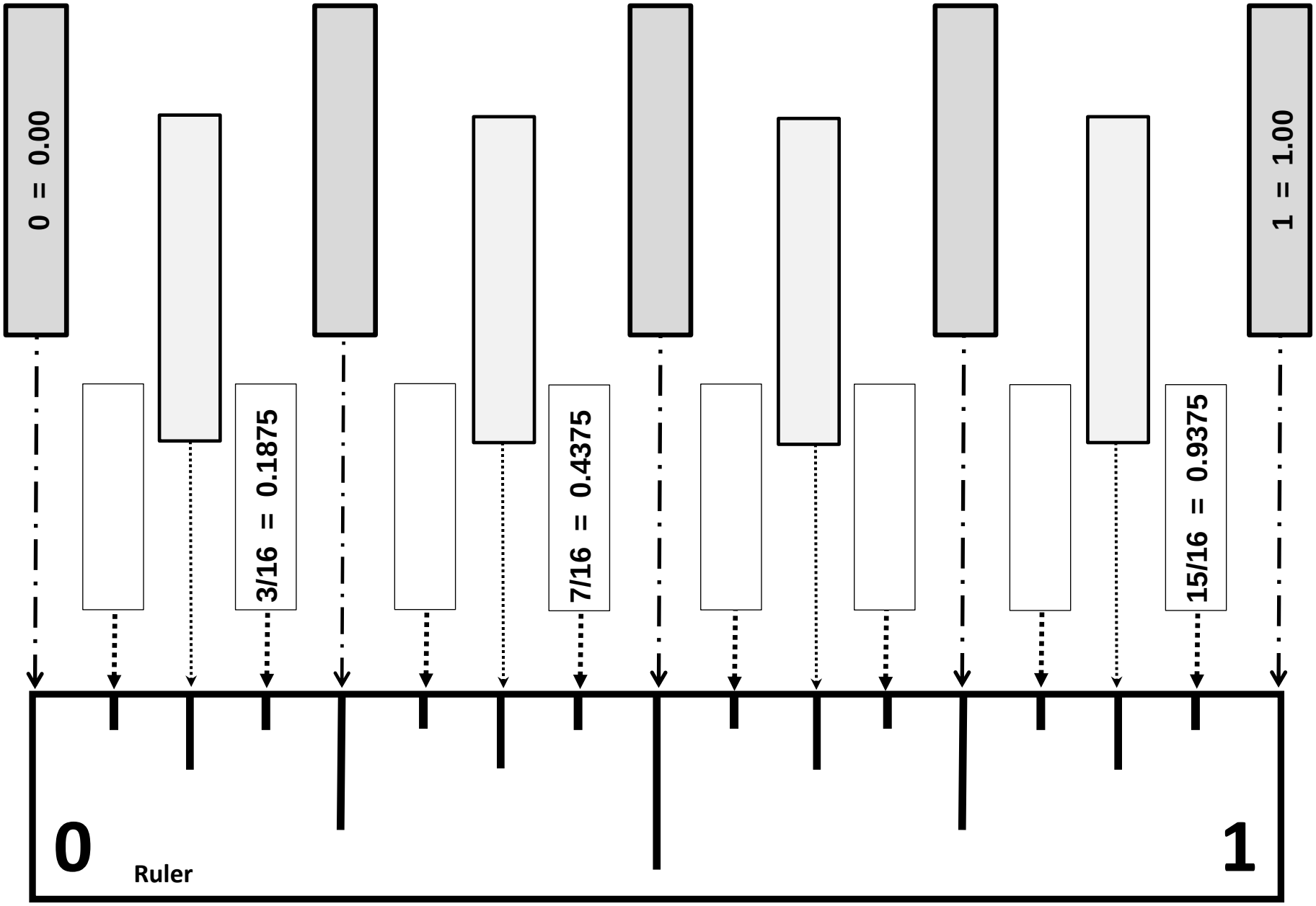
1 inch Ruler

(Proper Fractions, Mixed Numbers and Equivalent Decimals)

Learning to Read A Customary Ruler - Sixteenths

Directions: **Fill out the rectangle with the proper fraction equal to its decimal equivalent where the arrow points on the Ruler.**

Example: 8/16 = 4/8 = 2/4 = 1/2 = 0.50



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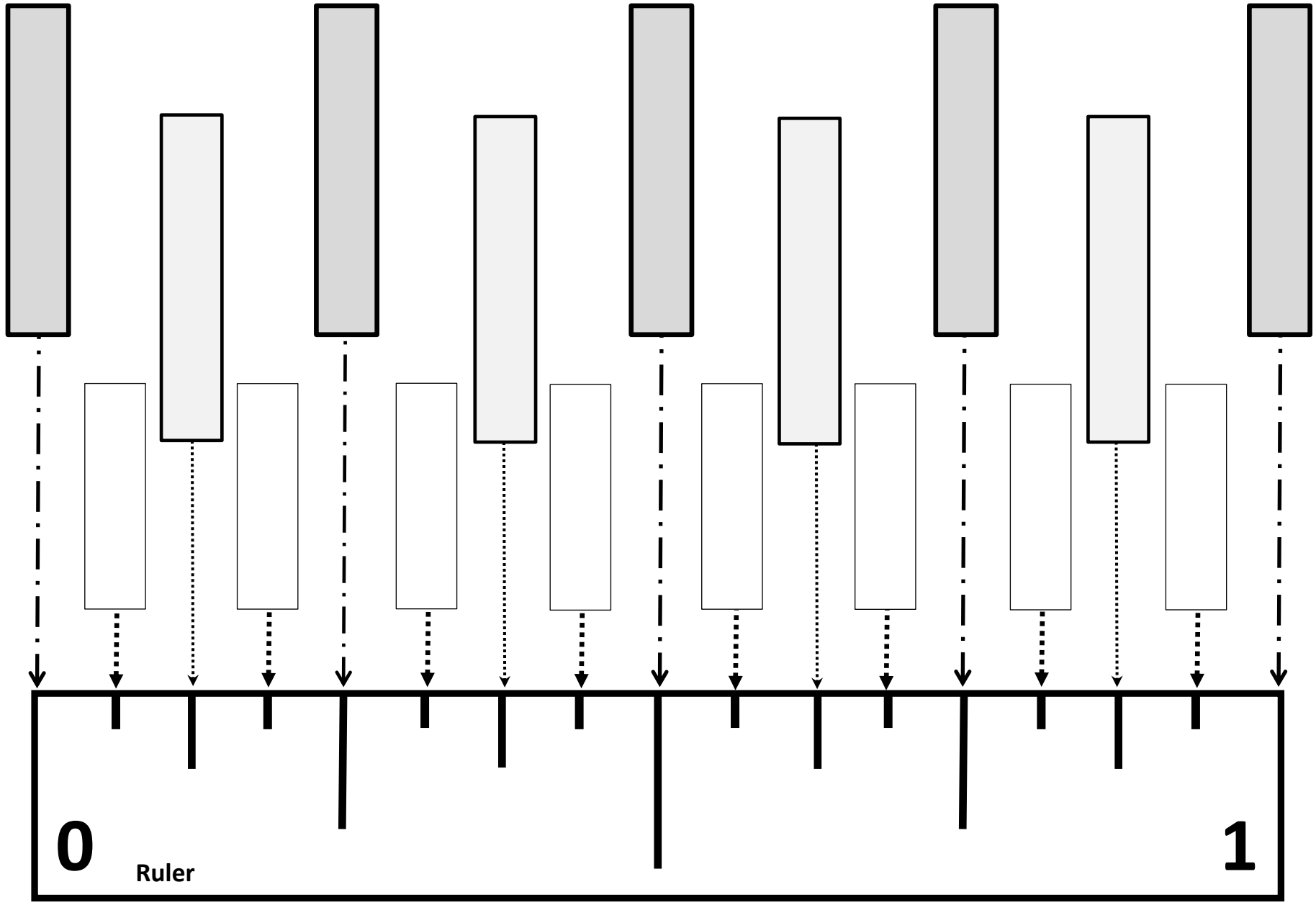
Learning to Read A Customary Ruler - Sixteenths

Directions: **Fill out the rectangle with the proper fraction equal to its decimal equivalent where the arrow points on the Ruler.**

Example: 8/16 = 4/8 = 2/4 = 1/2 = 0.50



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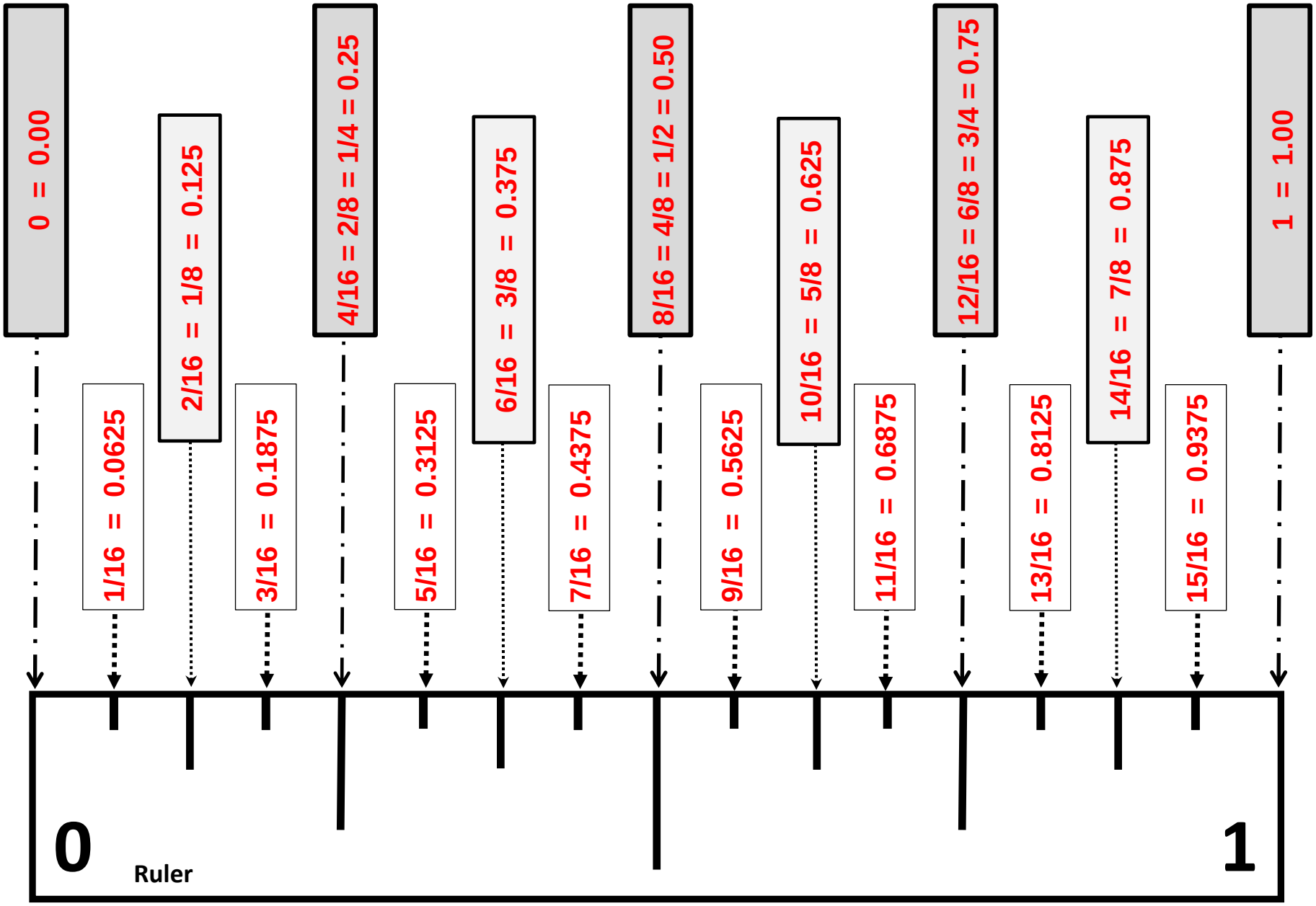
Learning to Read A Customary Ruler - Sixteenths

Directions: **Fill out the rectangle with the proper fraction equal to its decimal equivalent where the arrow points on the Ruler.**

Example: 8/16 = 4/8 = 2/4 = 1/2 = 0.50



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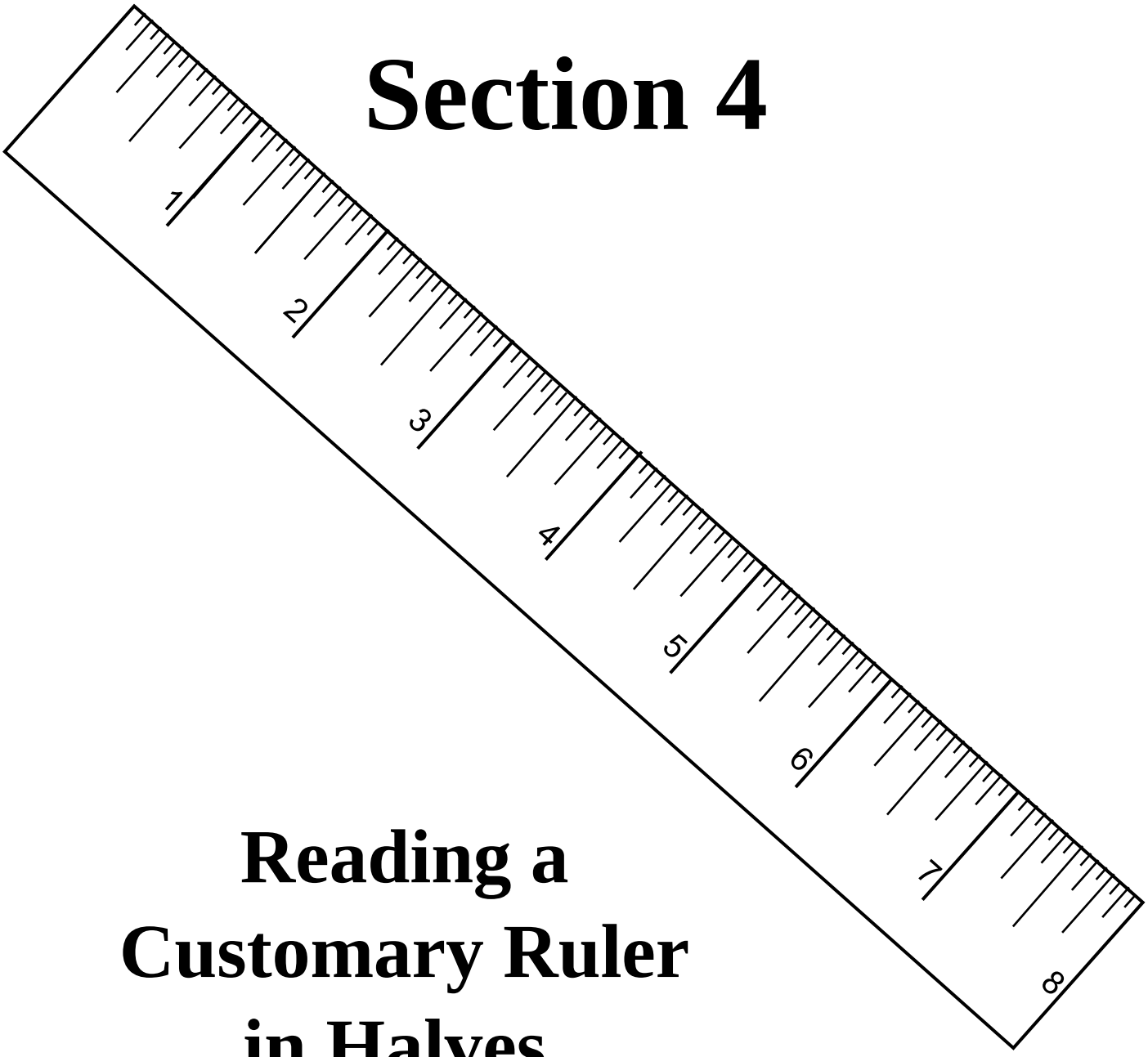
Section 4



Reading a Customary Ruler in Halves, Quarters, Eighths and Sixteenths

Section 4

Reading a Ruler

Halves and Quarters

8 inch Ruler

Version 1

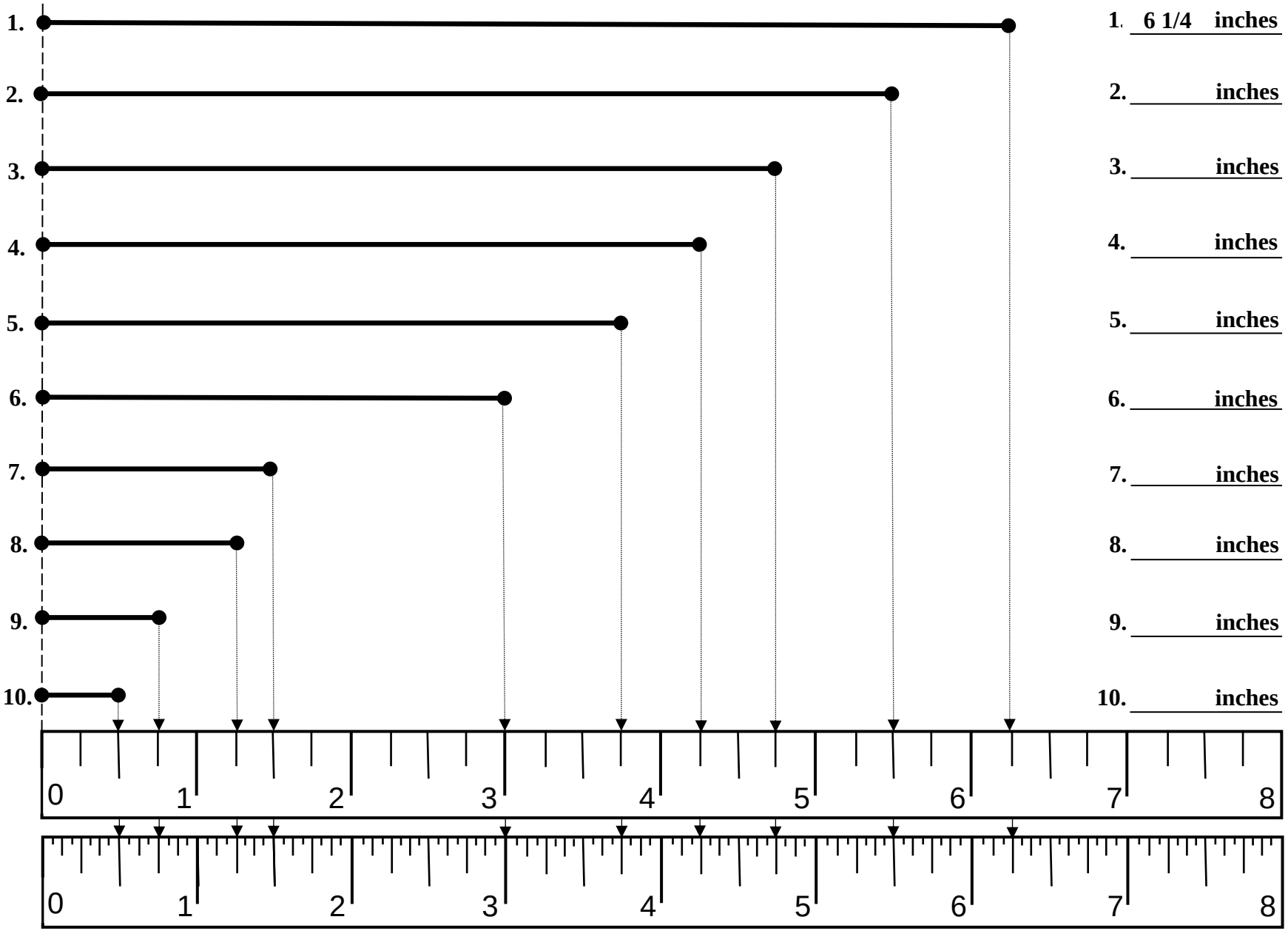
Version 2

Version 3

Reading a Customary Ruler in Halves and Quarters

-- Version 1 -- -- Version 1 -- -- Version 1 --

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 1/4 inches

2. _____ inches

3. _____ inches

4. _____ inches

5. _____ inches

6. _____ inches

7. _____ inches

8. _____ inches

9. _____ inches

10. _____ inches

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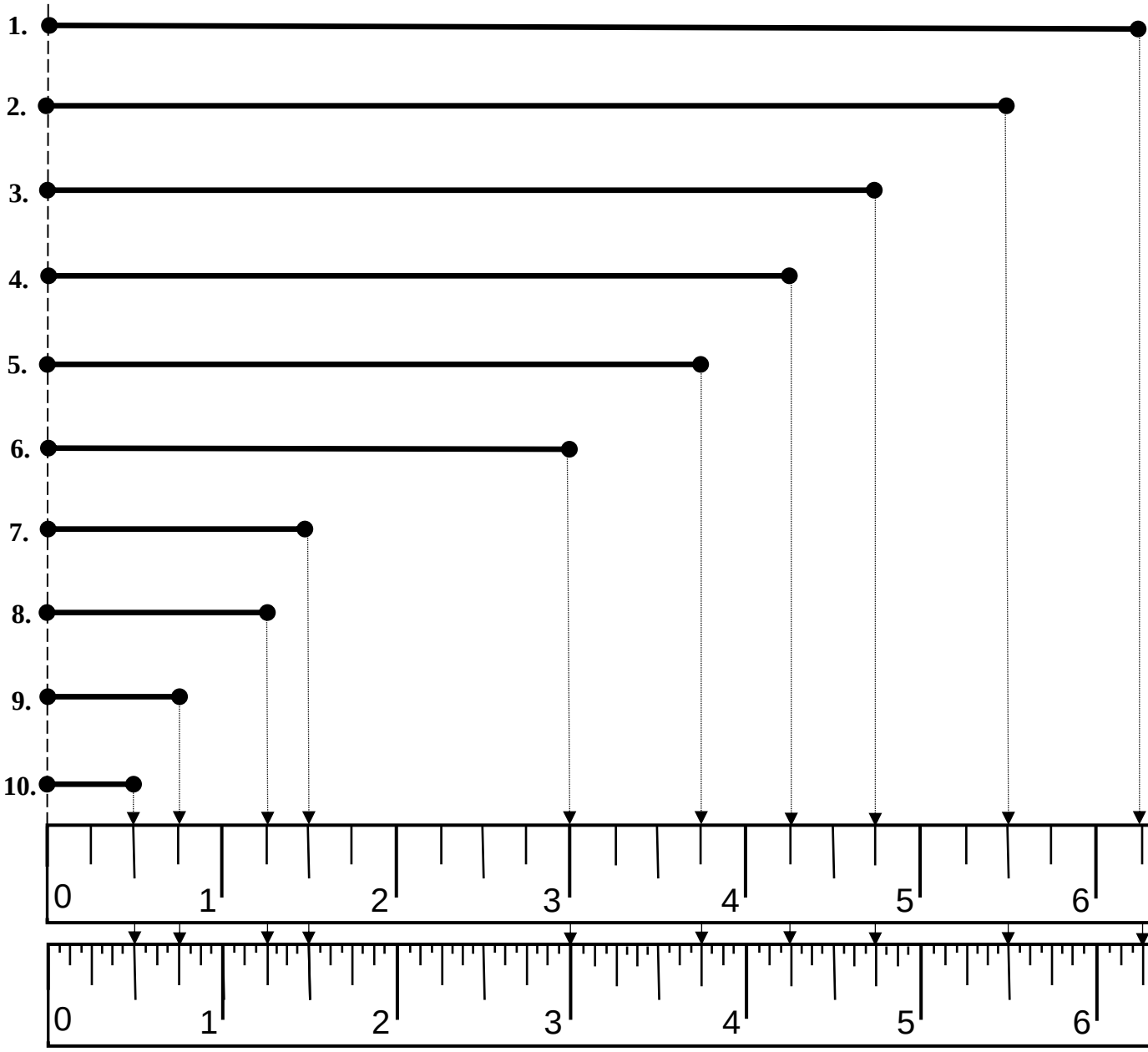
Reading a Customary Ruler in Halves and Quarters

-- Version 1 --

-- Version 1 --

-- Version 1 --

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 1/4 inches
2. 5 1/2 inches
3. 4 3/4 inches
4. 4 1/4 inches
5. 3 3/4 inches
6. 3 inches
7. 1 1/2 inches
8. 1 1/4 inches
9. 3/4 inches
10. 1/2 inches

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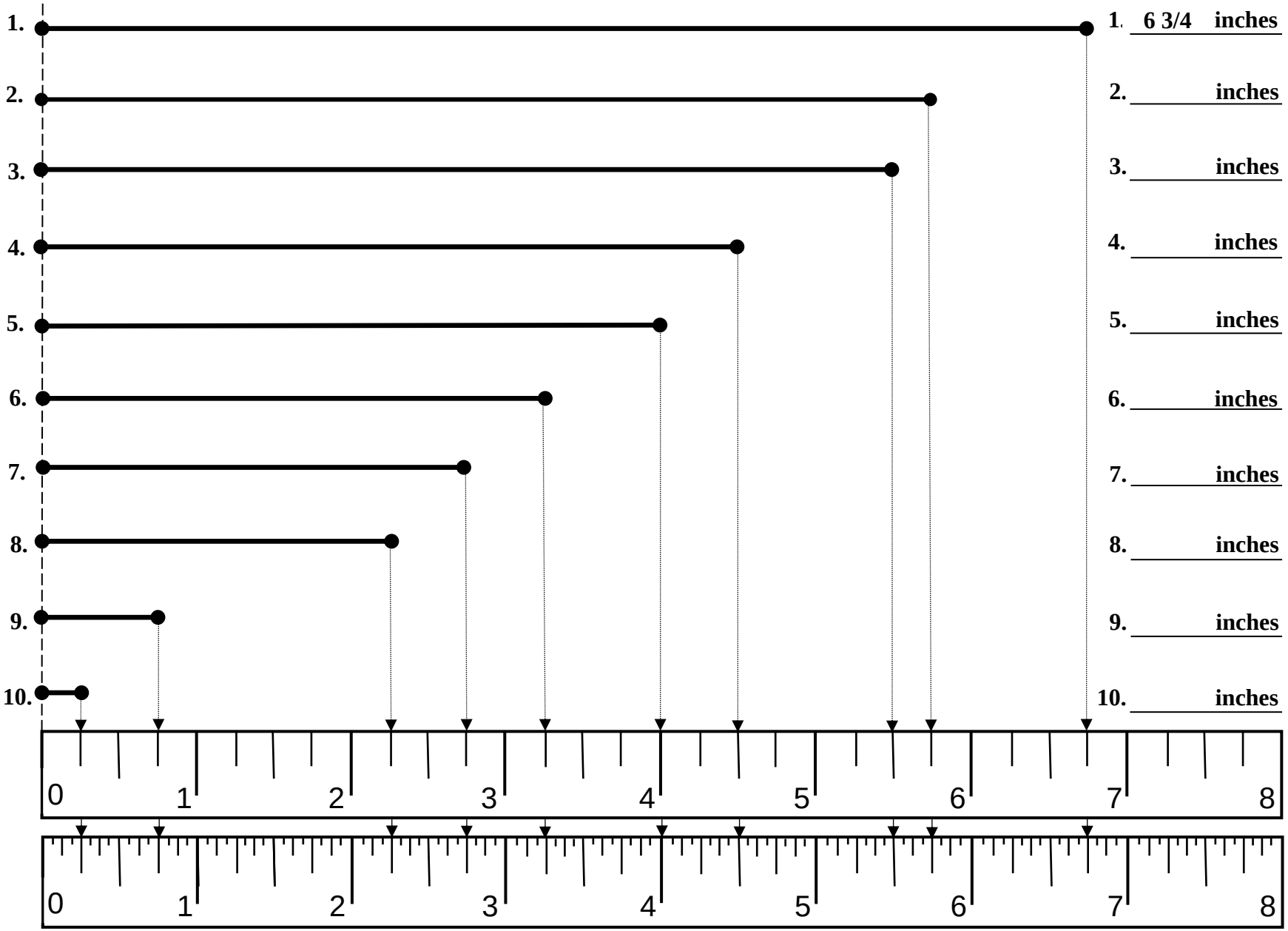
Reading a Customary Ruler in Halves and Quarters

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 3/4 inches
2. _____ inches
3. _____ inches
4. _____ inches
5. _____ inches
6. _____ inches
7. _____ inches
8. _____ inches
9. _____ inches
10. _____ inches

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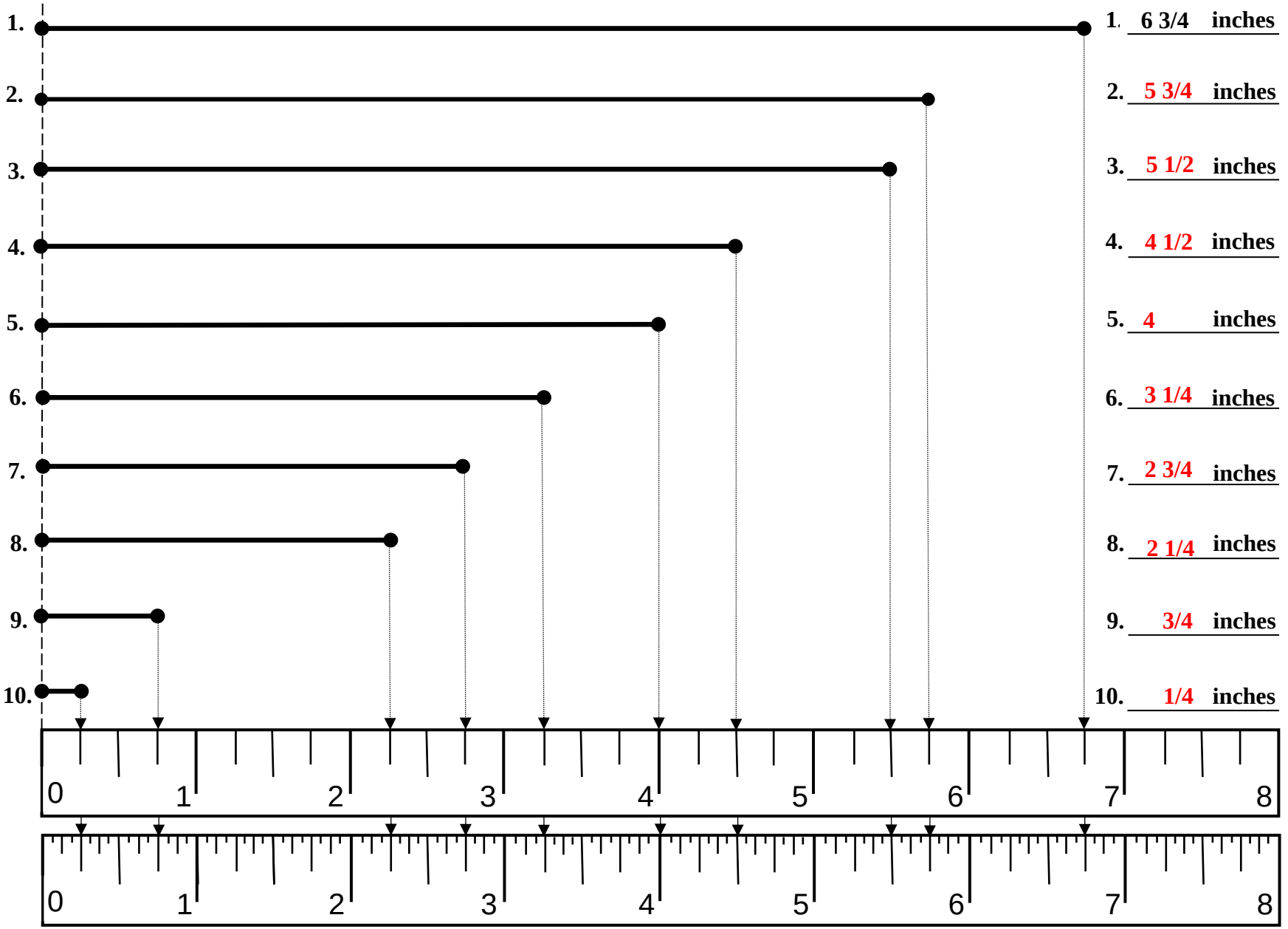
Reading a Customary Ruler in Halves and Quarters

-- Version 2 -- -- Version 2 -- -- Version 2 --

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 3/4 inches
2. 5 3/4 inches
3. 5 1/2 inches
4. 4 1/2 inches
5. 4 inches
6. 3 1/4 inches
7. 2 3/4 inches
8. 2 1/4 inches
9. 3/4 inches
10. 1/4 inches

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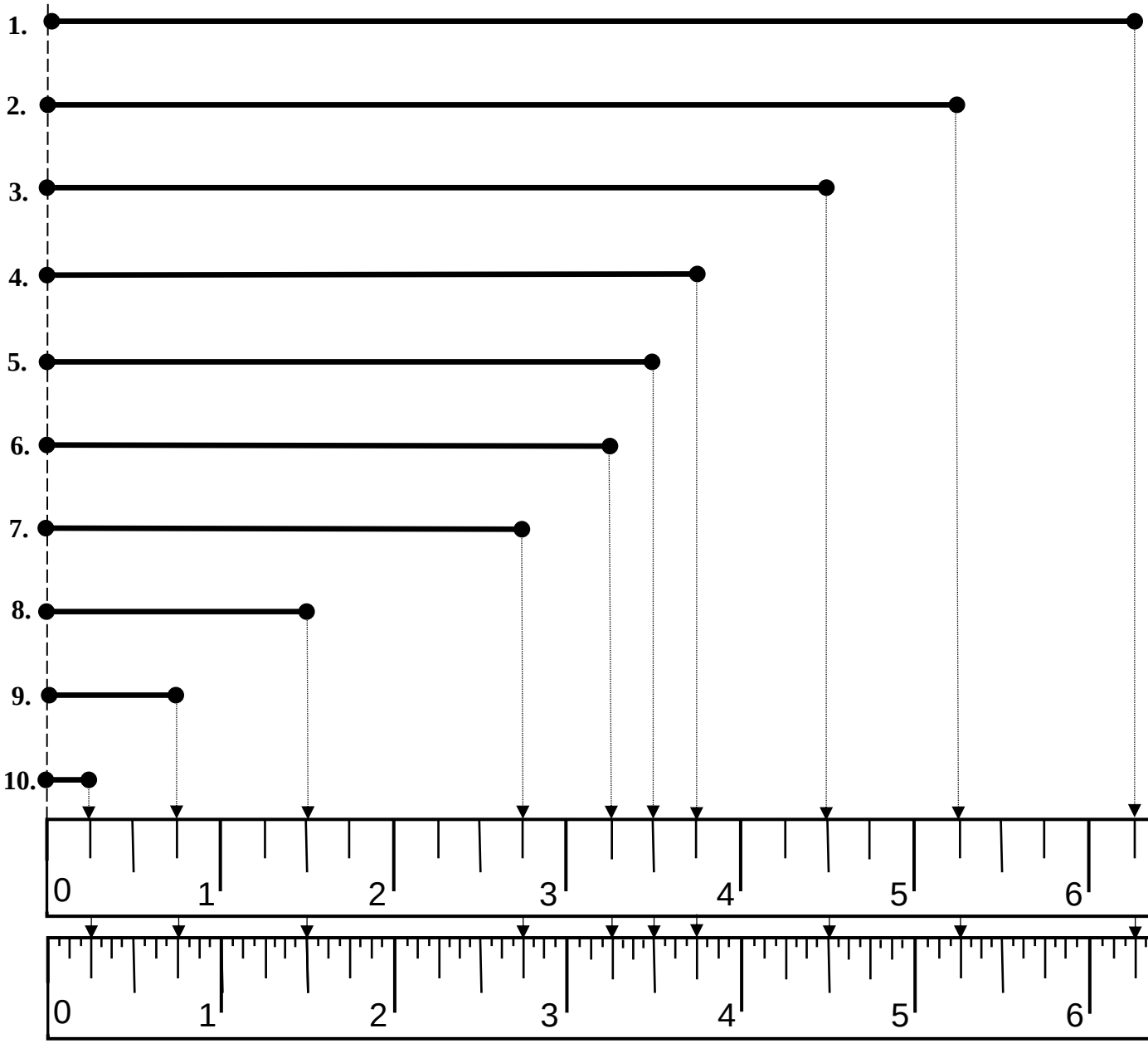
Reading a Customary Ruler in Halves and Quarters

-- Version 3 -- **-- Version 3 --** **-- Version 3 --**

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 1/4 inches

2. _____ inches

3. _____ inches

4. _____ inches

5. _____ inches

6. _____ inches

7. _____ inches

8. _____ inches

9. _____ inches

10. _____ inches

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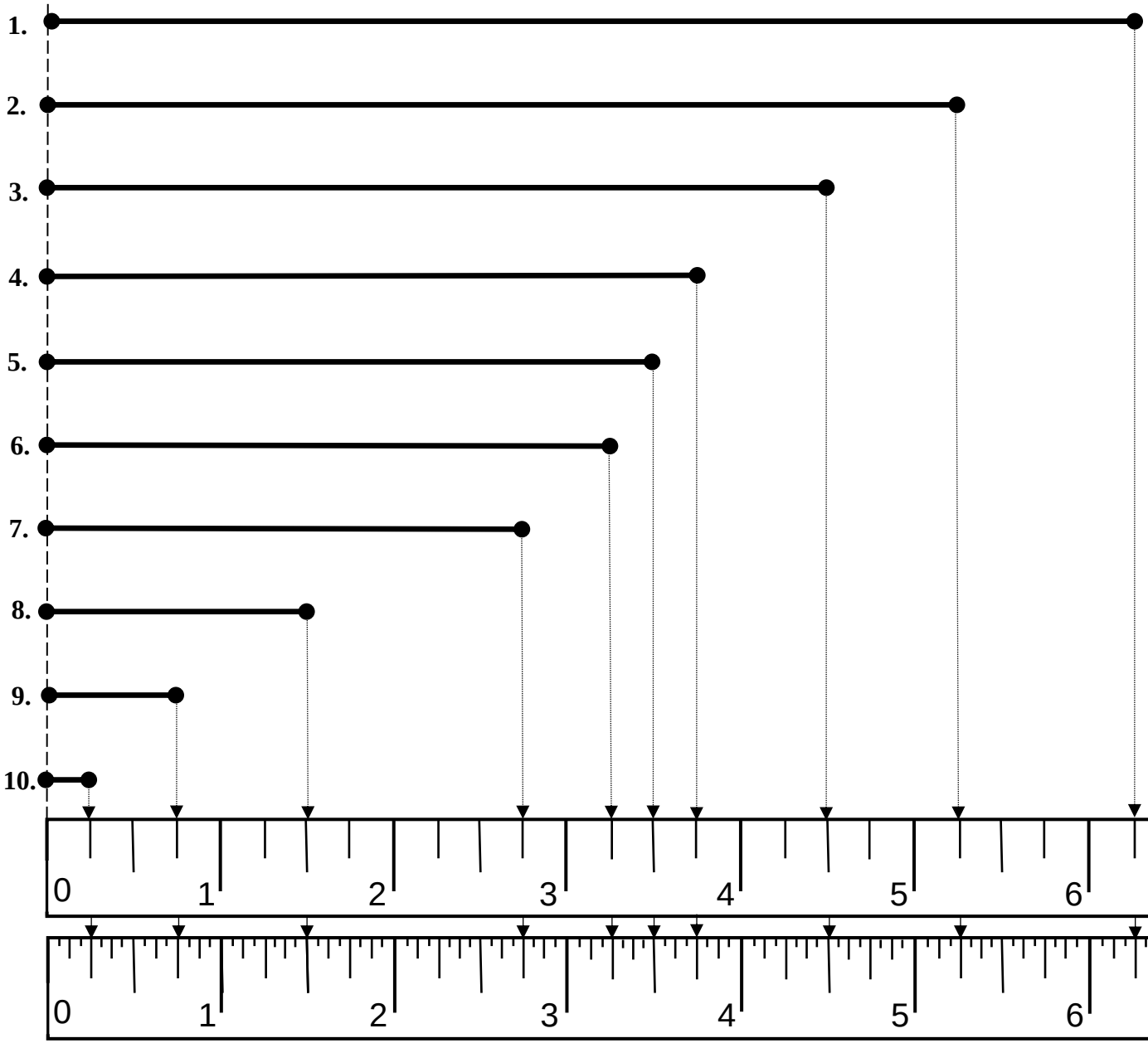
Reading a Customary Ruler in Halves and Quarters

-- Version 3 -- -- Version 3 -- -- Version 3 --

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 1/4 inches
2. 5 1/4 inches
3. 4 1/2 inches
4. 3 3/4 inches
5. 3 1/2 inches
6. 3 1/4 inches
7. 2 3/4 inches
8. 1 1/2 inches
9. 3/4 inches
10. 1/4 inches

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Section 4

Reading a Ruler

Eighths

8 inch Ruler

Version 1

Version 2

Version 3

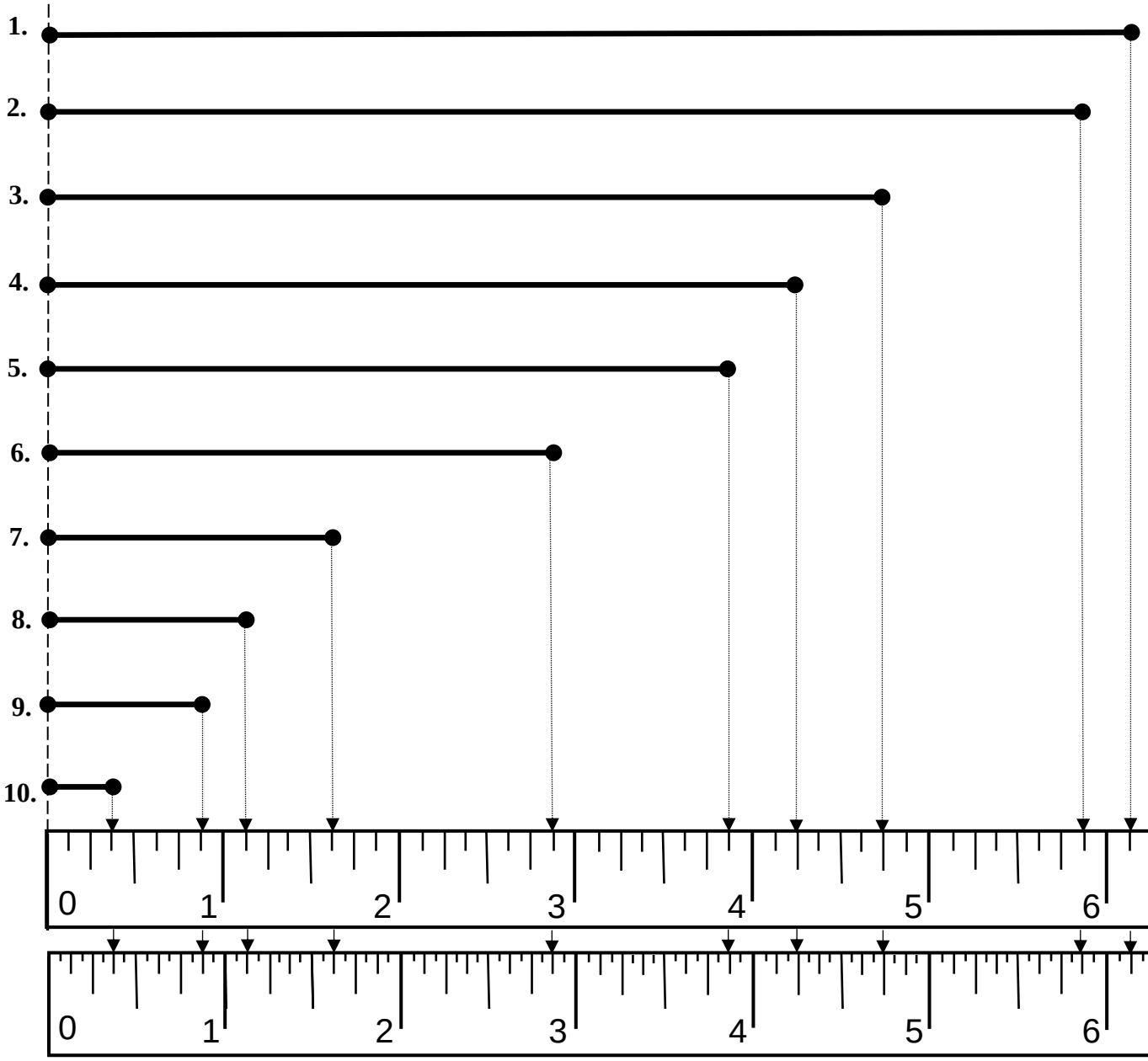
Version 4

Version 5

Reading a Customary Ruler in Eighths – 8 inch Ruler

-- Version 1 -- **-- Version 1 --** **-- Version 1 --**

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 1/8 inches

2. _____ inches

3. _____ inches

4. _____ inches

5. _____ inches

6. _____ inches

7. _____ inches

8. _____ inches

9. _____ inches

10. _____ inches

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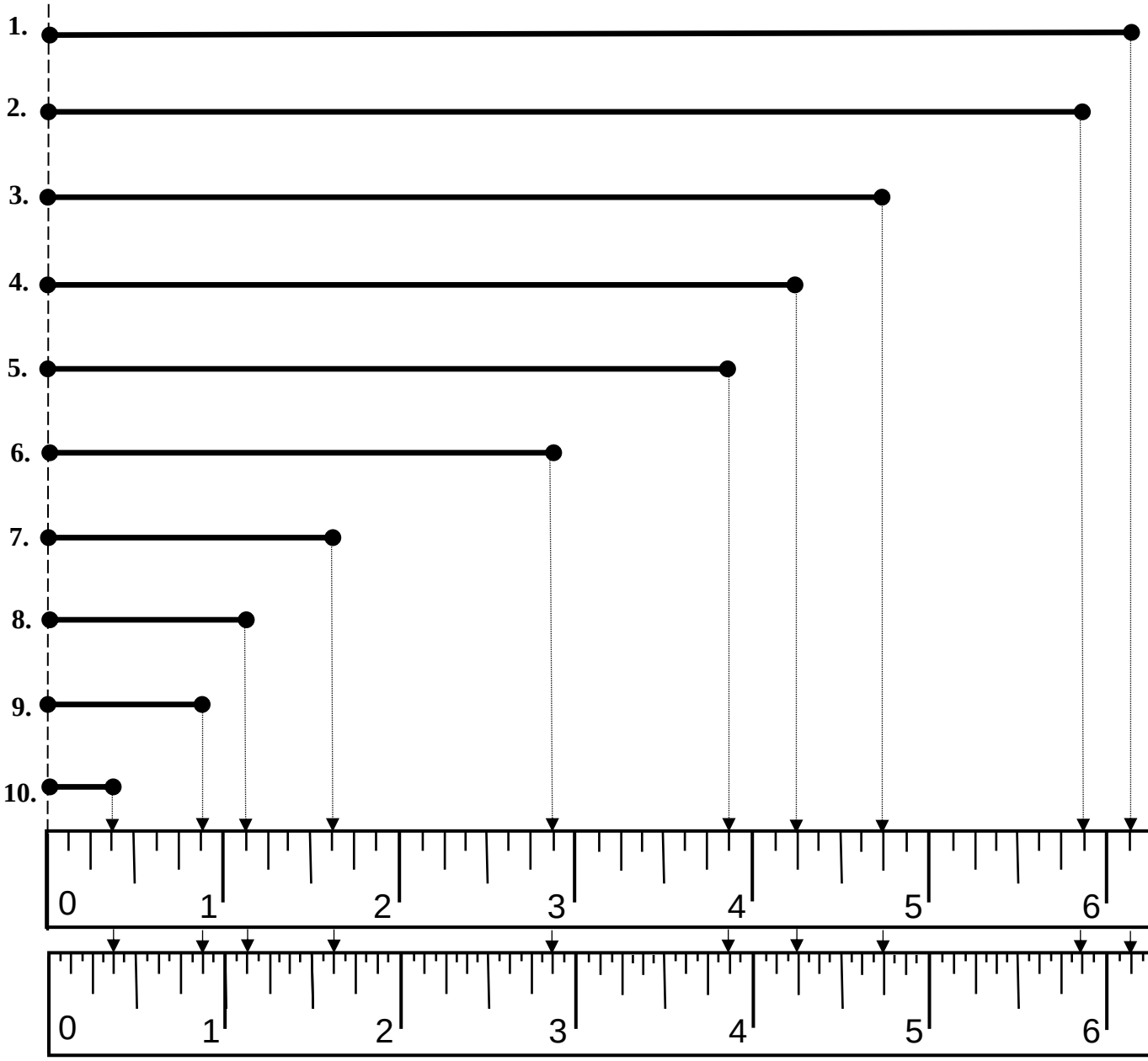
Reading a Customary Ruler in Eighths – 8 inch Ruler

-- Version 1 -- -- Version 1 -- -- Version 1 --

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 1/8 inches
2. 5 7/8 inches
3. 4 3/4 inches
4. 4 1/4 inches
5. 3 7/8 inches
6. 2 7/8 inches
7. 1 5/8 inches
8. 1 1/8 inches
9. 7/8 inches
10. 3/8 inches

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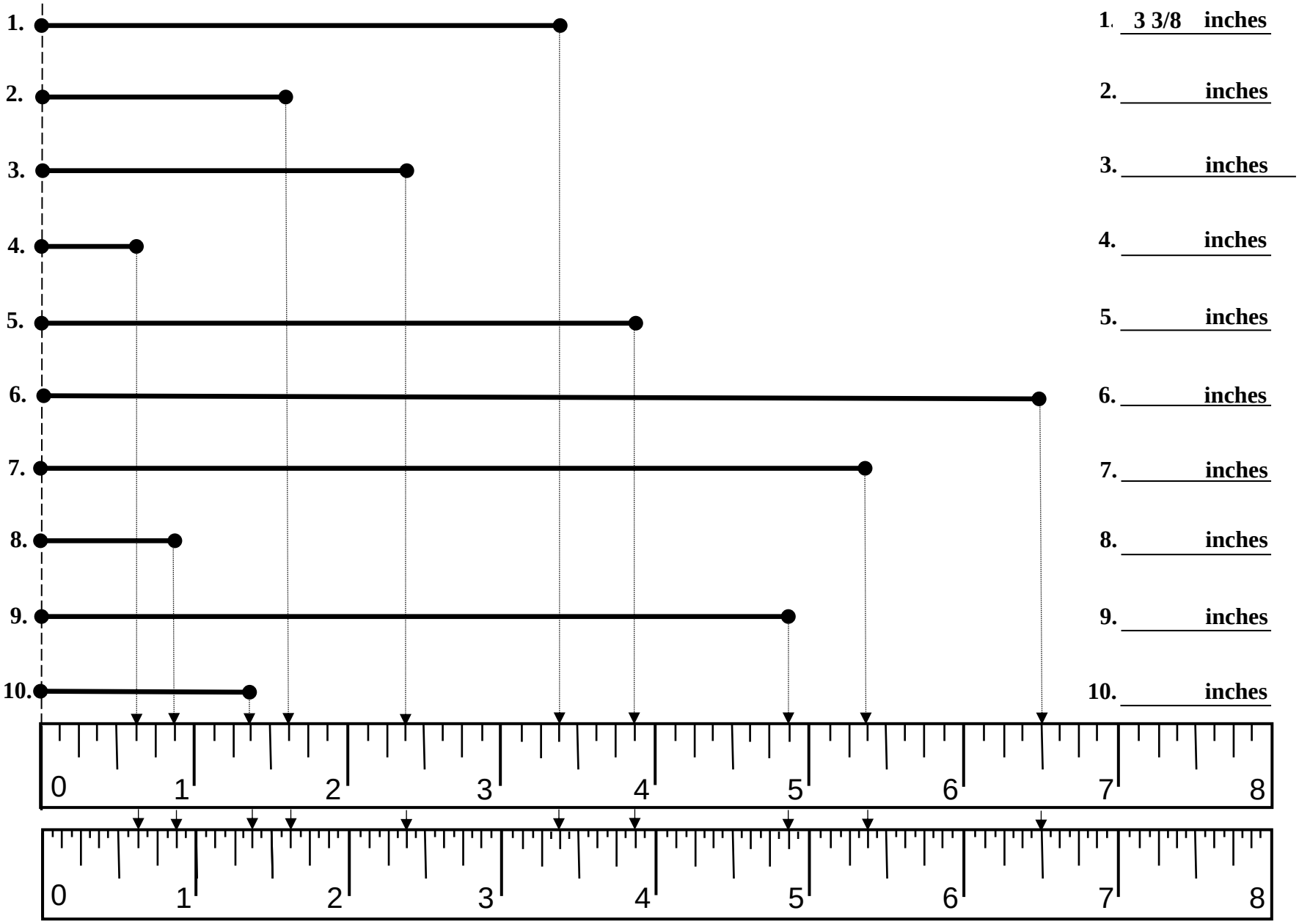
Reading a Customary Ruler in Eighths – 8 inch Ruler

-- Version 2 -- **-- Version 2 --** **-- Version 2 --**

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 3 3/8 inches
2. _____ inches
3. _____ inches
4. _____ inches
5. _____ inches
6. _____ inches
7. _____ inches
8. _____ inches
9. _____ inches
10. _____ inches

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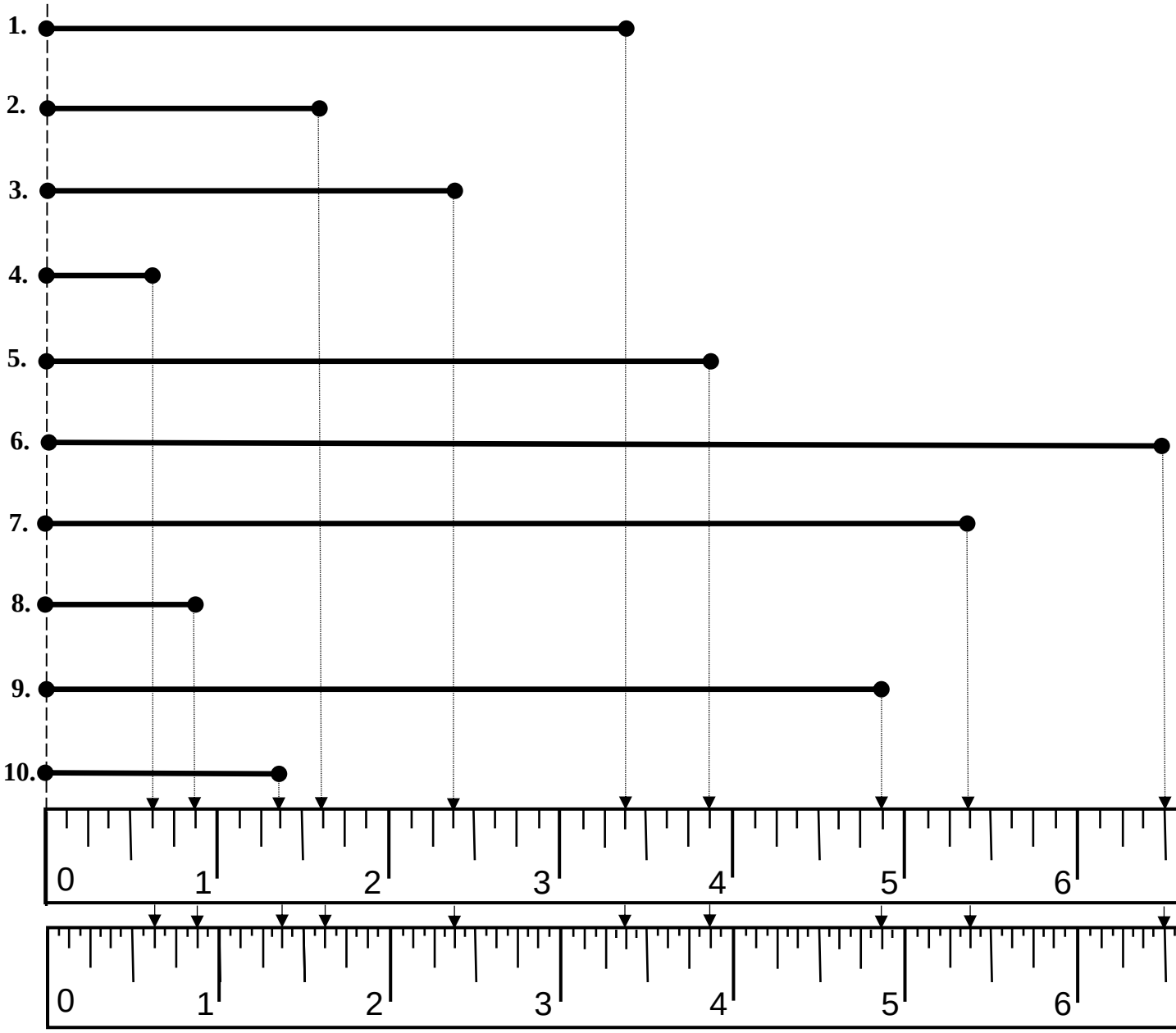
Reading a Customary Ruler in Eighths – 8 inch Ruler

-- Version 2 -- -- Version 2 -- -- Version 2 --

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 3 3/8 inches
2. 1 5/8 inches
3. 2 3/8 inches
4. 5/8 inches
5. 4 7/8 inches
6. 6 1/2 inches
7. 5 3/8 inches
8. 7/8 inches
9. 4 7/8 inches
10. 1 3/8 inches

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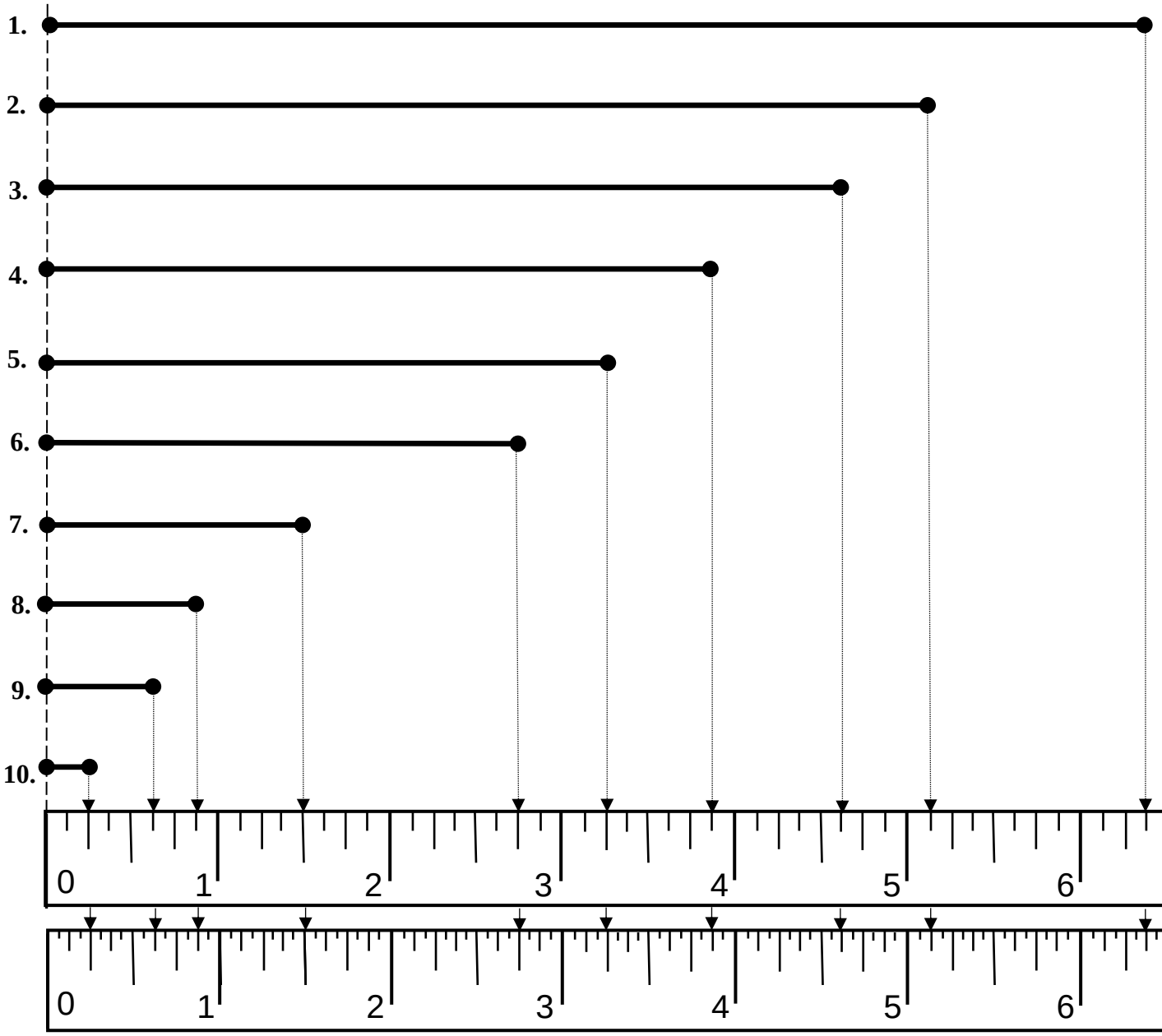
Reading a Customary Ruler in Eighths – 8 inch Ruler

-- Version 3 -- **-- Version 3 --** **-- Version 3 --**

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 3/8 inches

2. _____ inches

3. _____ inches

4. _____ inches

5. _____ inches

6. _____ inches

7. _____ inches

8. _____ inches

9. _____ inches

10. _____ inches

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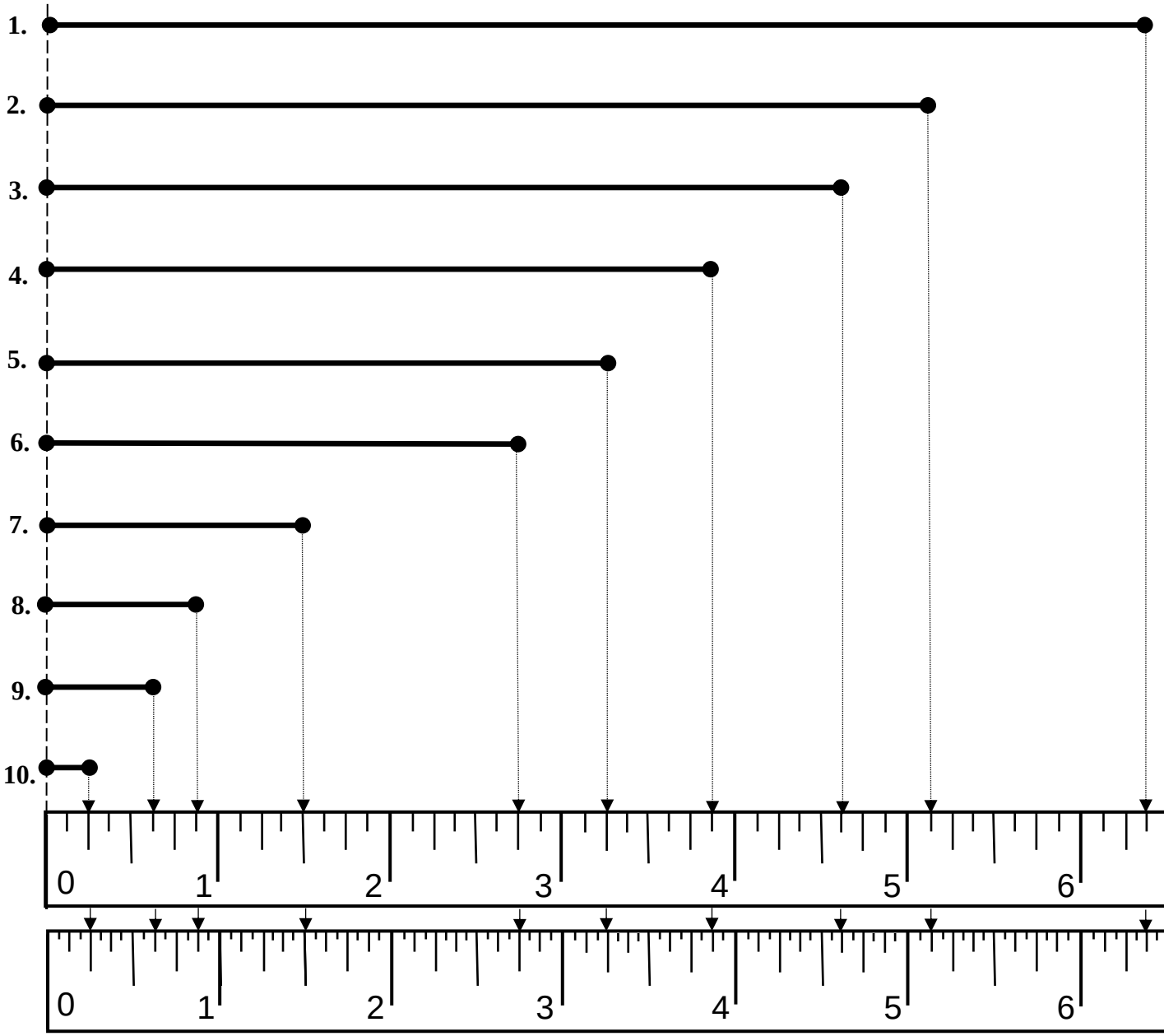
Reading a Customary Ruler in Eighths – 8 inch Ruler

-- Version 3 -- -- Version 3 -- -- Version 3 --

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 3/8 inches
2. 5 1/8 inches
3. 4 5/8 inches
4. 3 7/8 inches
5. 3 1/4 inches
6. 2 3/4 inches
7. 1 1/2 inches
8. 7/8 inches
9. 5/8 inches
10. 1/4 inches

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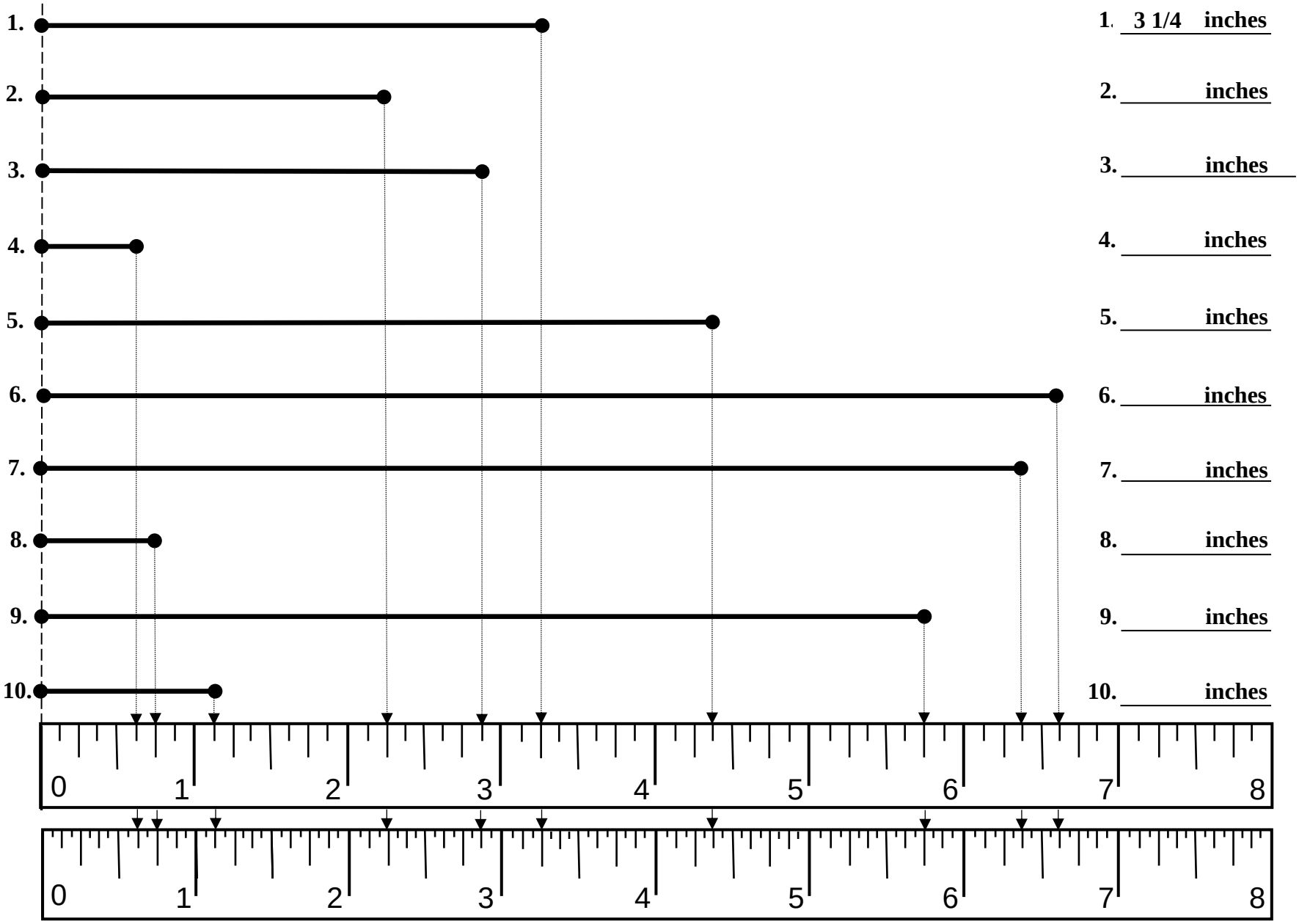
Reading a Customary Ruler in Eighths – 8 inch Ruler

-- Version 4 -- **-- Version 4 --** **-- Version 4 --**

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 3 1/4 inches

2. _____ inches

3. _____ inches

4. _____ inches

5. _____ inches

6. _____ inches

7. _____ inches

8. _____ inches

9. _____ inches

10. _____ inches

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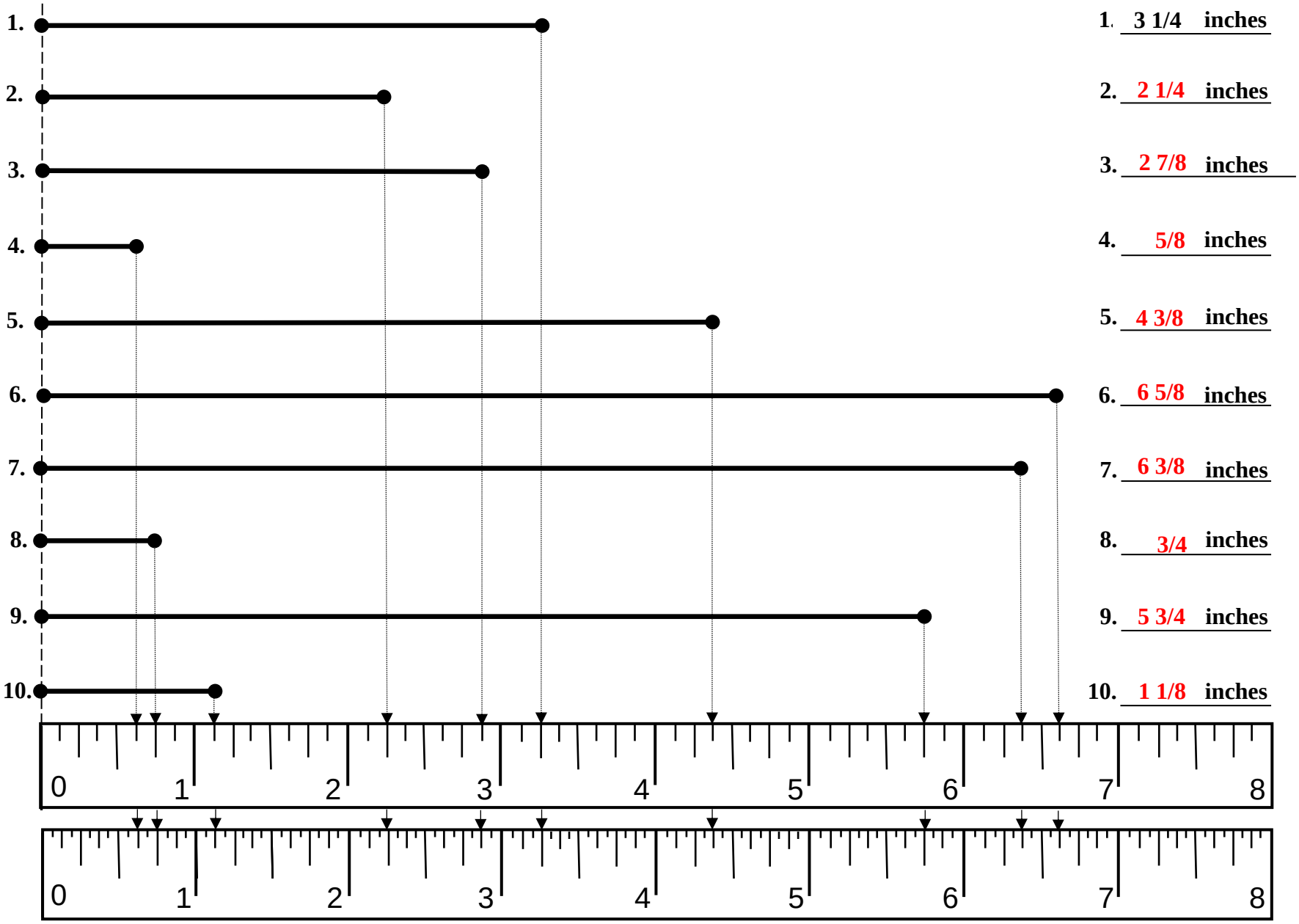
Reading a Customary Ruler in Eighths – 8 inch Ruler

-- Version 4 -- -- Version 4 -- -- Version 4 --

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 3 1/4 inches
2. 2 1/4 inches
3. 2 7/8 inches
4. 5/8 inches
5. 4 3/8 inches
6. 6 5/8 inches
7. 6 3/8 inches
8. 3/4 inches
9. 5 3/4 inches
10. 1 1/8 inches

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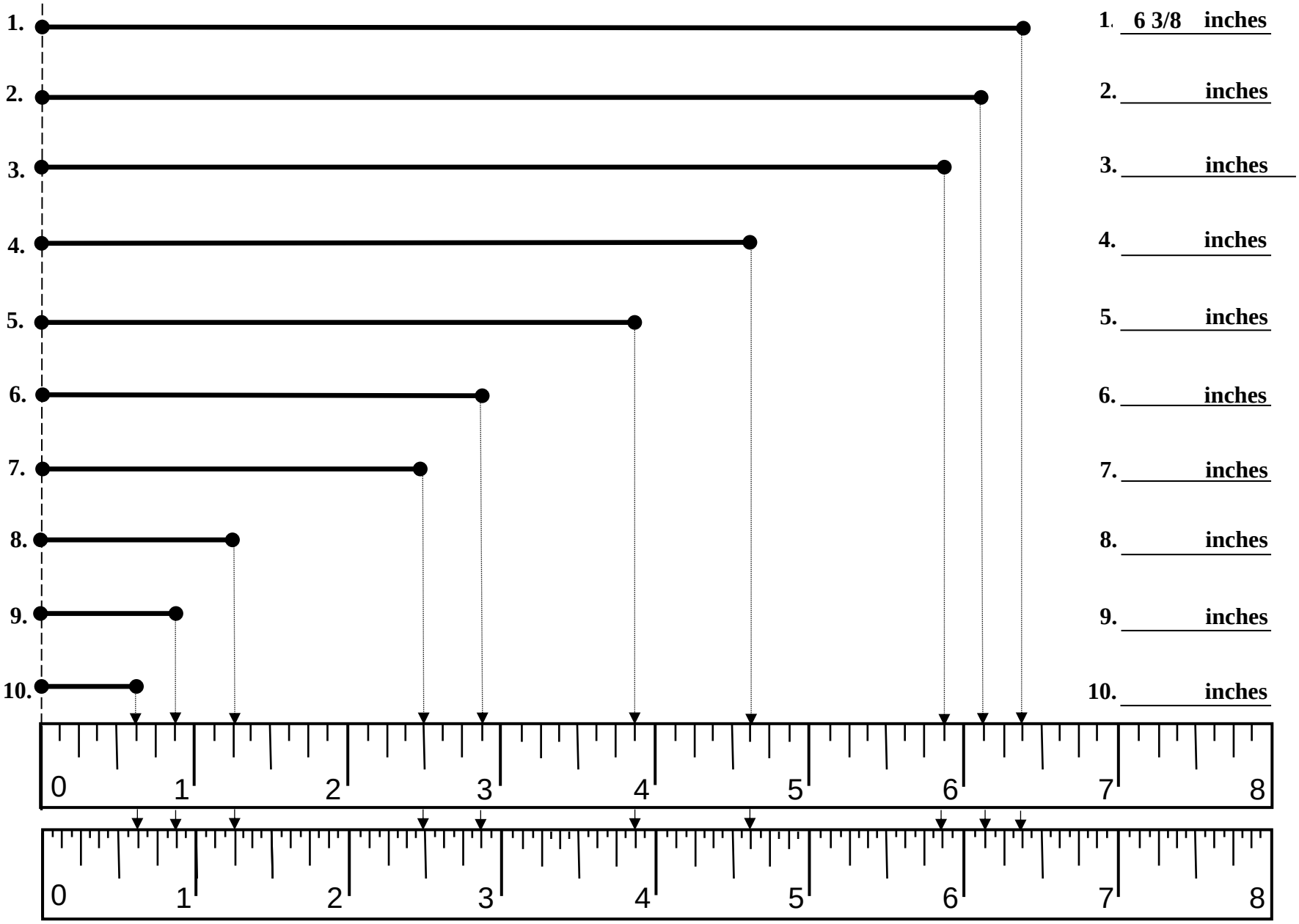
Reading a Customary Ruler in Eighths – 8 inch Ruler

-- Version 5 -- **-- Version 5 --** **-- Version 5 --**

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 3/8 inches
2. _____ inches
3. _____ inches
4. _____ inches
5. _____ inches
6. _____ inches
7. _____ inches
8. _____ inches
9. _____ inches
10. _____ inches

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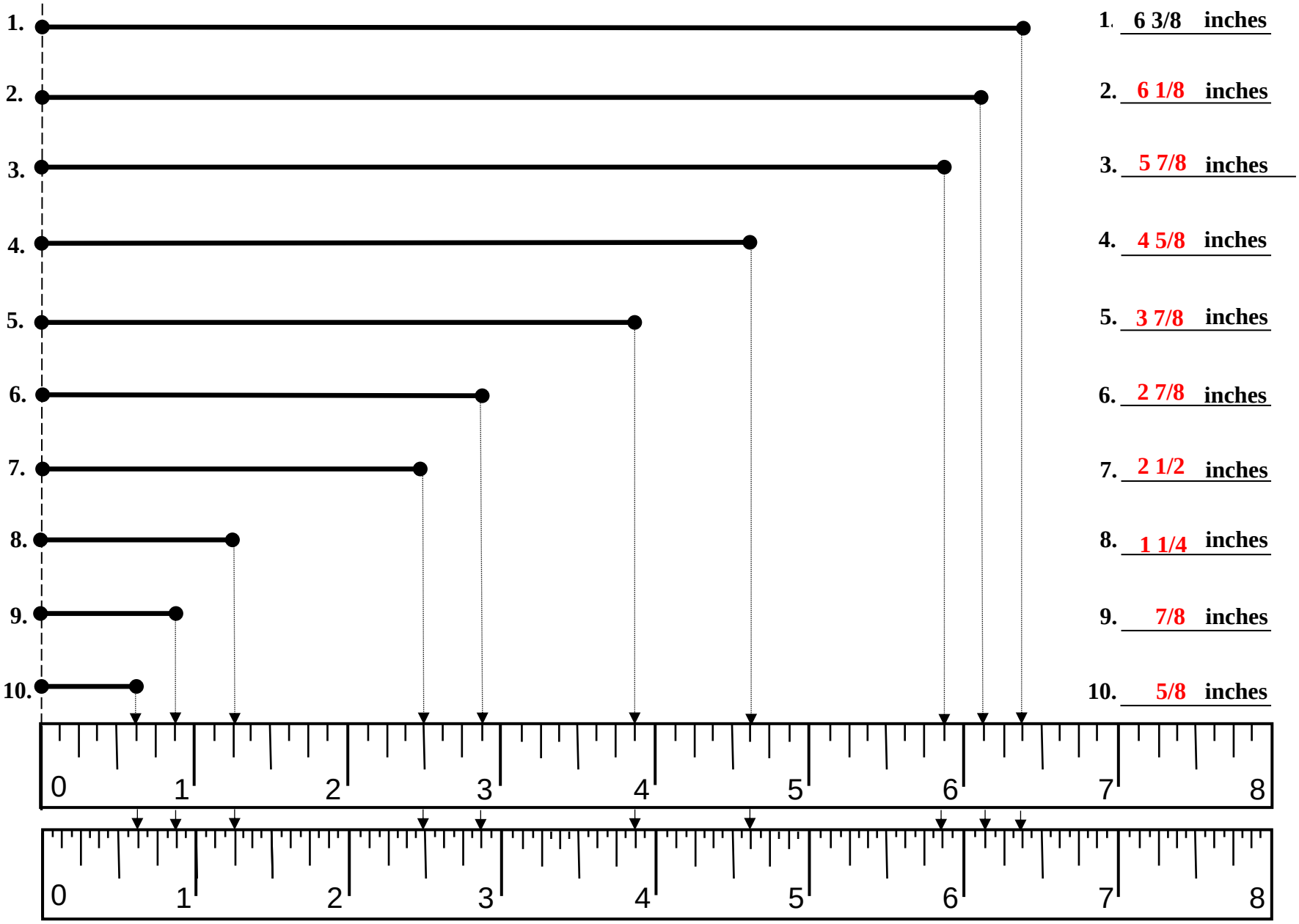
Reading a Customary Ruler in Eighths – 8 inch Ruler

-- Version 5 --

-- Version 5 --

-- Version 5 --

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 3/8 inches
2. 6 1/8 inches
3. 5 7/8 inches
4. 4 5/8 inches
5. 3 7/8 inches
6. 2 7/8 inches
7. 2 1/2 inches
8. 1 1/4 inches
9. 7/8 inches
10. 5/8 inches

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Section 4

Reading a Ruler

Sixteenths

8 inch Ruler

Version 1

Version 2

Version 3

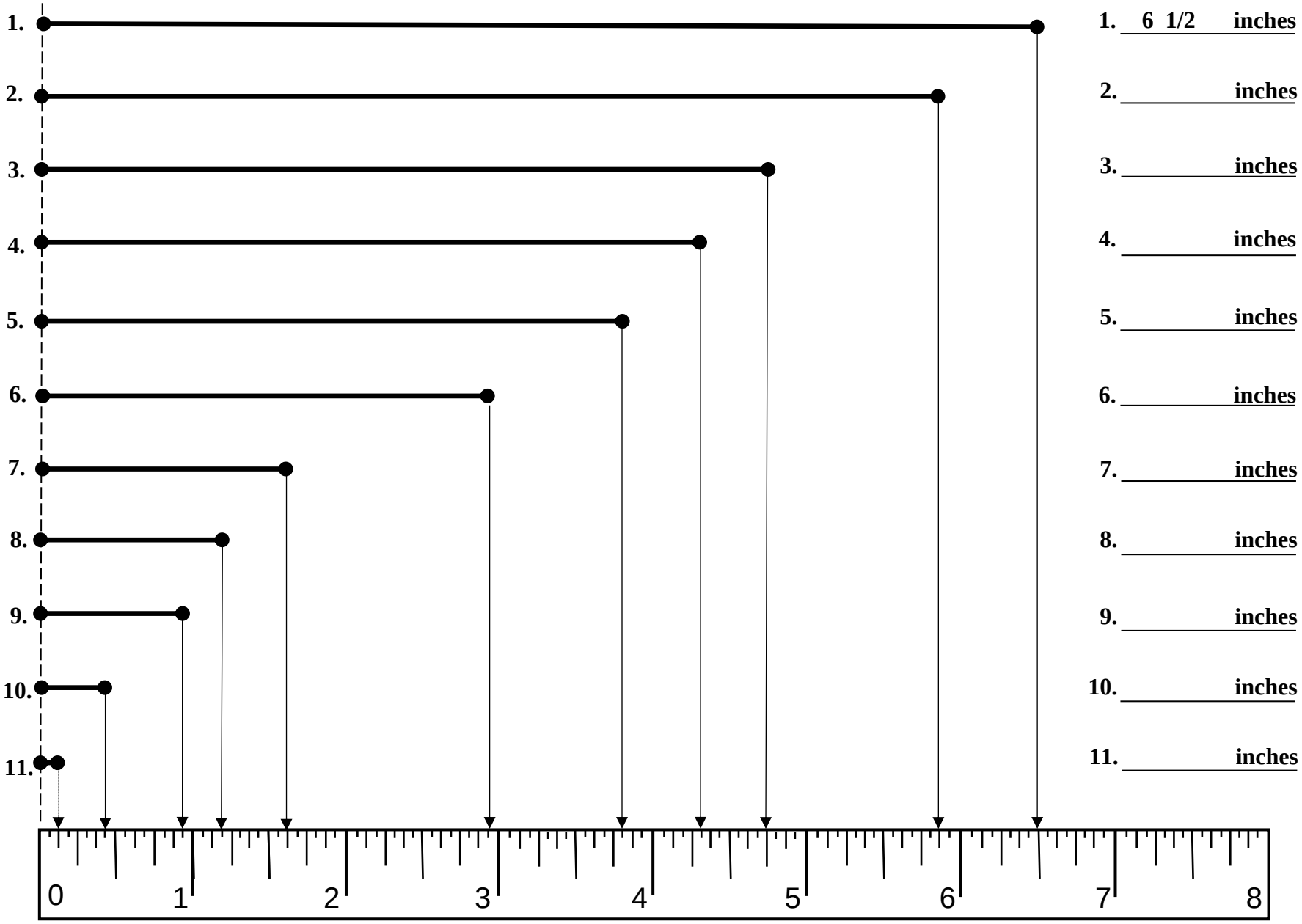
Version 4

Version 5

Reading a Customary Ruler in Sixteenths – 8 inch Ruler

-- Version 1 -- **-- Version 1 --** **-- Version 1 --**

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 1/2 inches
2. _____ inches
3. _____ inches
4. _____ inches
5. _____ inches
6. _____ inches
7. _____ inches
8. _____ inches
9. _____ inches
10. _____ inches
11. _____ inches

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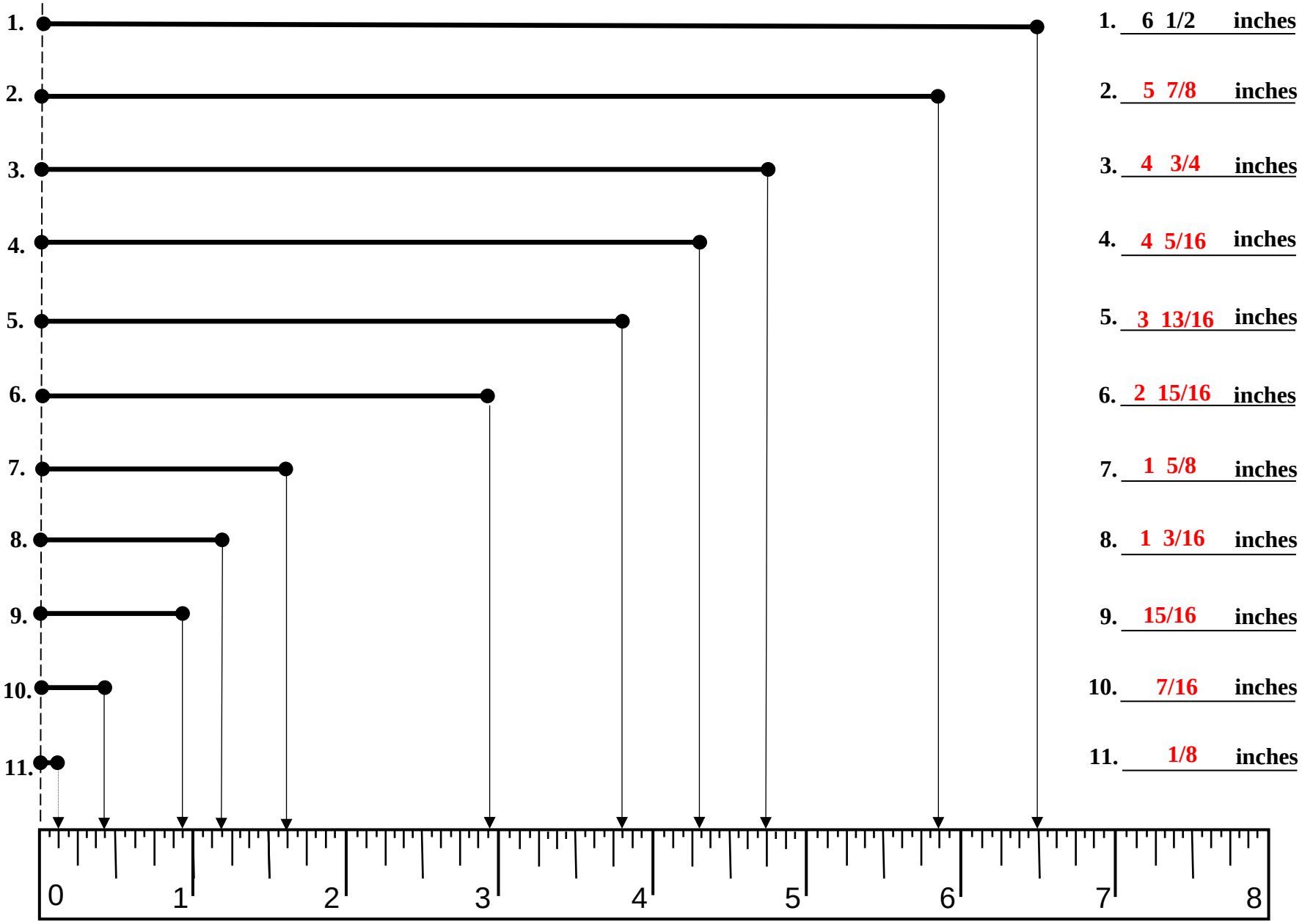
Reading a Customary Ruler in Sixteenths – 8 inch Ruler

-- Version 1 --

-- Version 1 --

-- Version 1 --

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 1/2 inches
2. 5 7/8 inches
3. 4 3/4 inches
4. 4 5/16 inches
5. 3 13/16 inches
6. 2 15/16 inches
7. 1 5/8 inches
8. 1 3/16 inches
9. 15/16 inches
10. 7/16 inches
11. 1/8 inches

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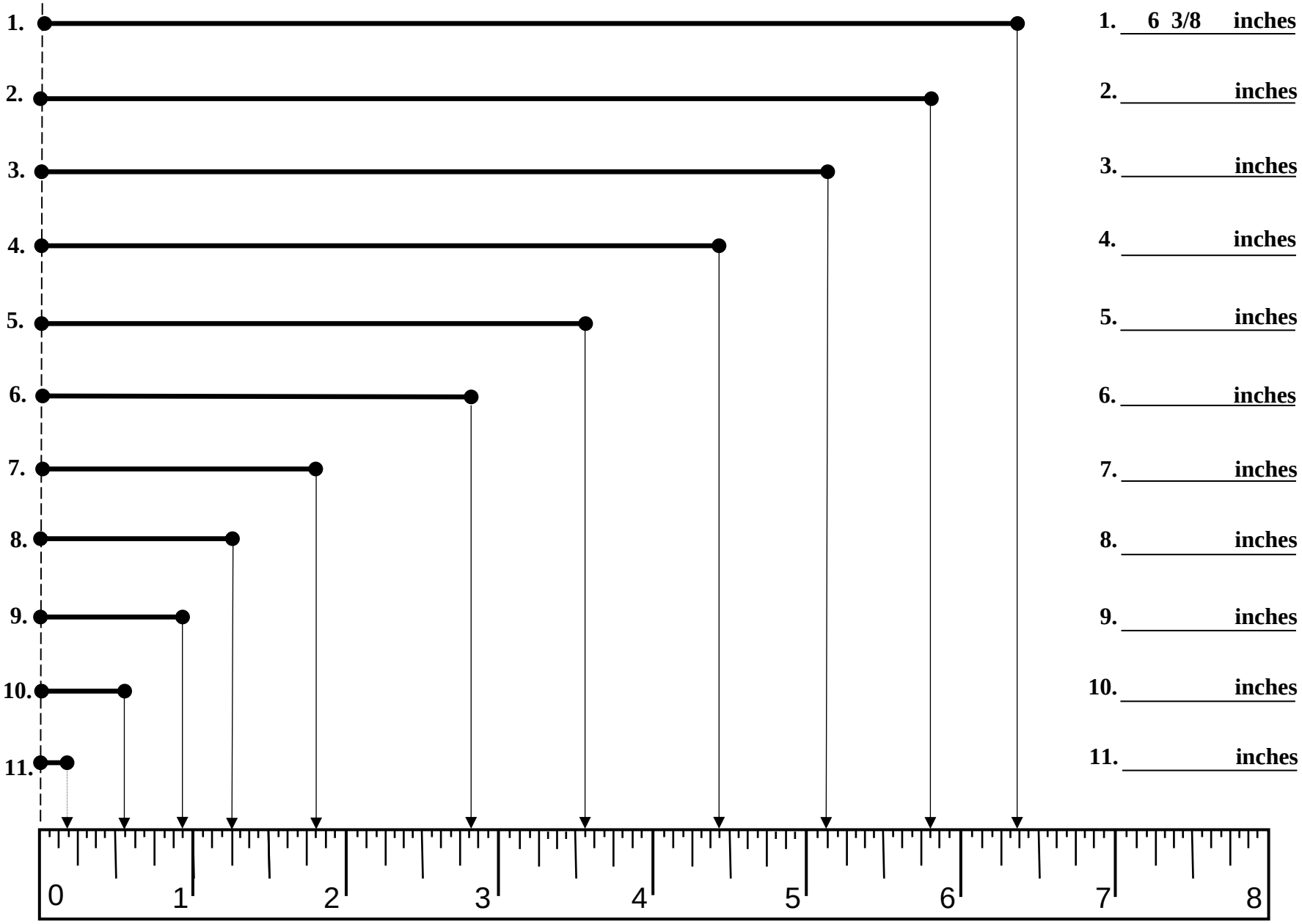
Reading a Customary Ruler in Sixteenths – 8 inch Ruler

-- Version 2 -- -- Version 2 -- -- Version 2 --

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 3/8 inches
2. _____ inches
3. _____ inches
4. _____ inches
5. _____ inches
6. _____ inches
7. _____ inches
8. _____ inches
9. _____ inches
10. _____ inches
11. _____ inches

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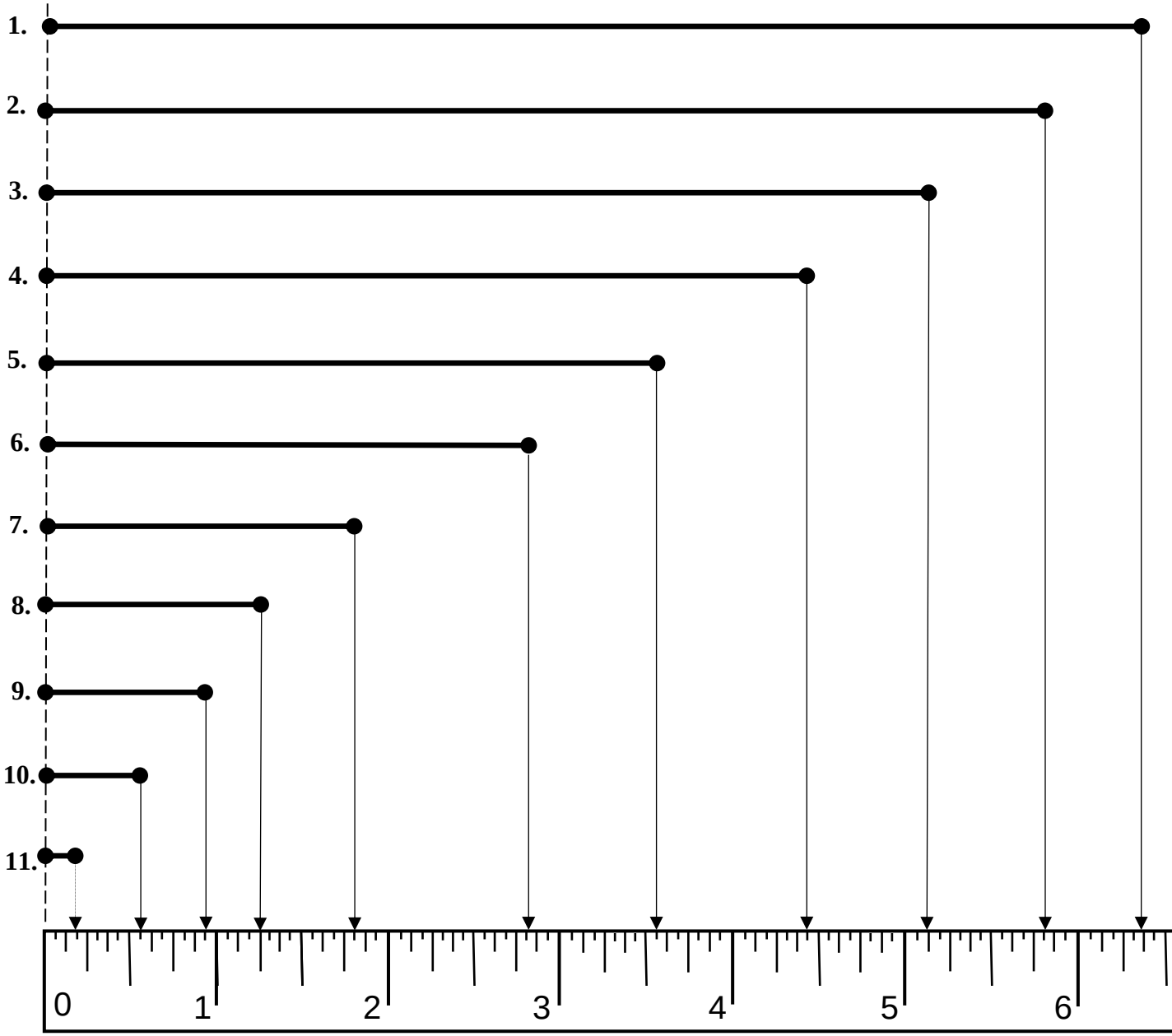
Reading a Customary Ruler in Sixteenths – 8 inch Ruler

-- Version 2 --

-- Version 2 --

-- Version 2 --

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 3/8 inches
2. 5 13/16 inches
3. 5 1/8 inches
4. 4 7/16 inches
5. 3 9/16 inches
6. 2 13/16 inches
7. 1 13/16 inches
8. 1 1/4 inches
9. 15/16 inches
10. 9/16 inches
11. 3/16 inches

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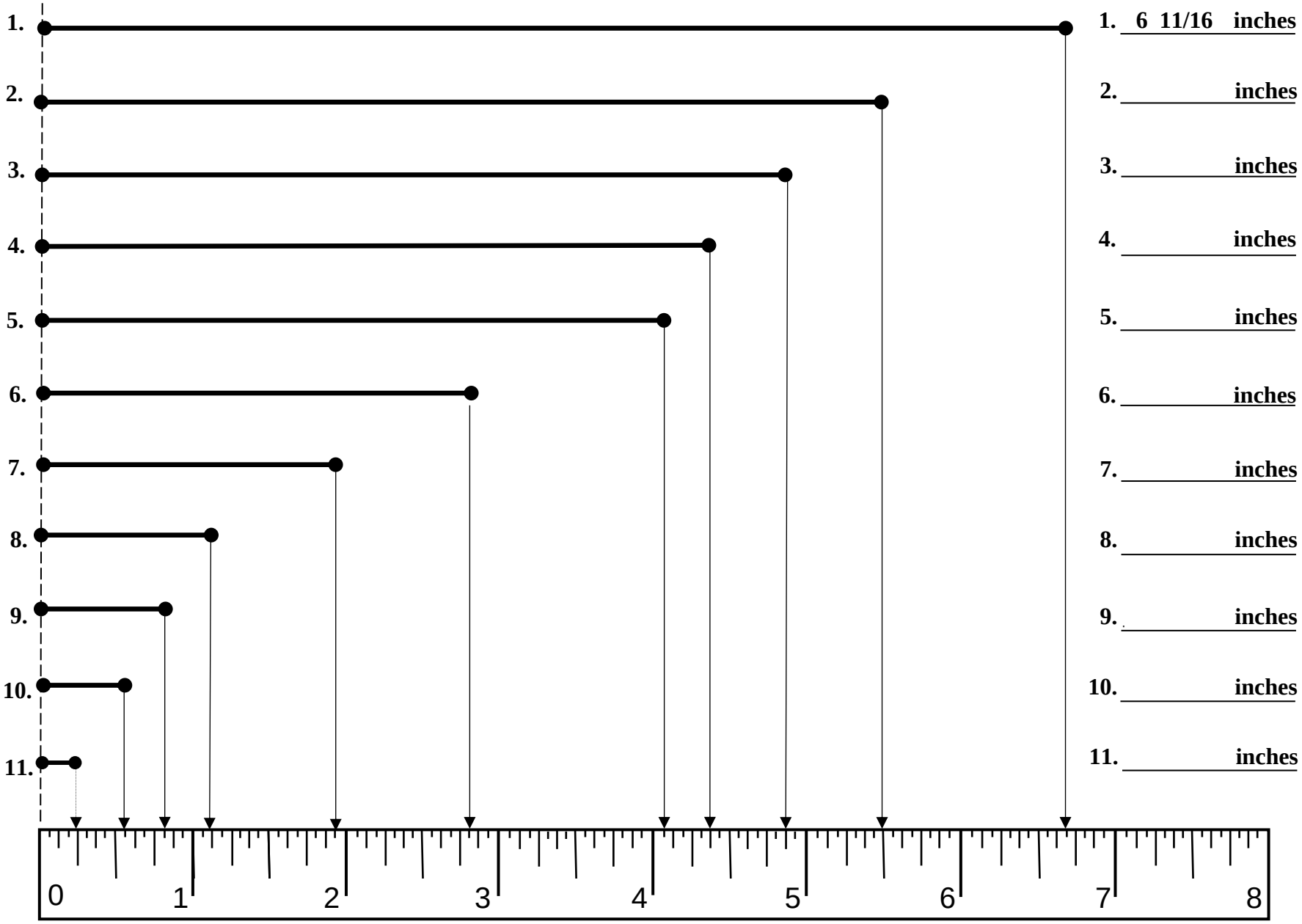
Reading a Customary Ruler in Sixteenths – 8 inch Ruler

-- Version 3 -- **-- Version 3 --** **-- Version 3 --**

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 11/16 inches
2. _____ inches
3. _____ inches
4. _____ inches
5. _____ inches
6. _____ inches
7. _____ inches
8. _____ inches
9. _____ inches
10. _____ inches
11. _____ inches

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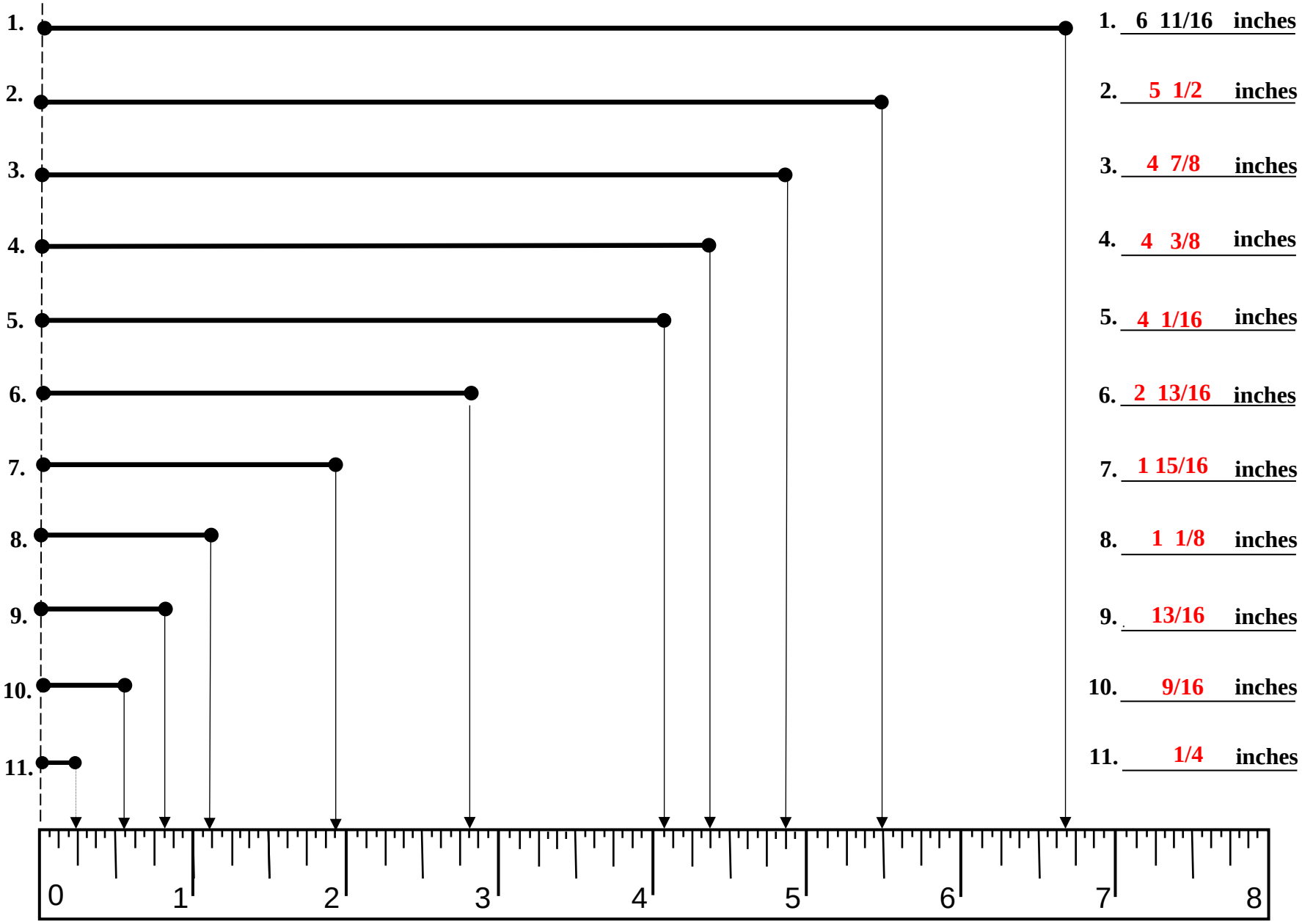
Reading a Customary Ruler in Sixteenths – 8 inch Ruler

-- Version 3 -- -- Version 3 -- -- Version 3 --

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 11/16 inches
2. 5 1/2 inches
3. 4 7/8 inches
4. 4 3/8 inches
5. 4 1/16 inches
6. 2 13/16 inches
7. 1 15/16 inches
8. 1 1/8 inches
9. 13/16 inches
10. 9/16 inches
11. 1/4 inches

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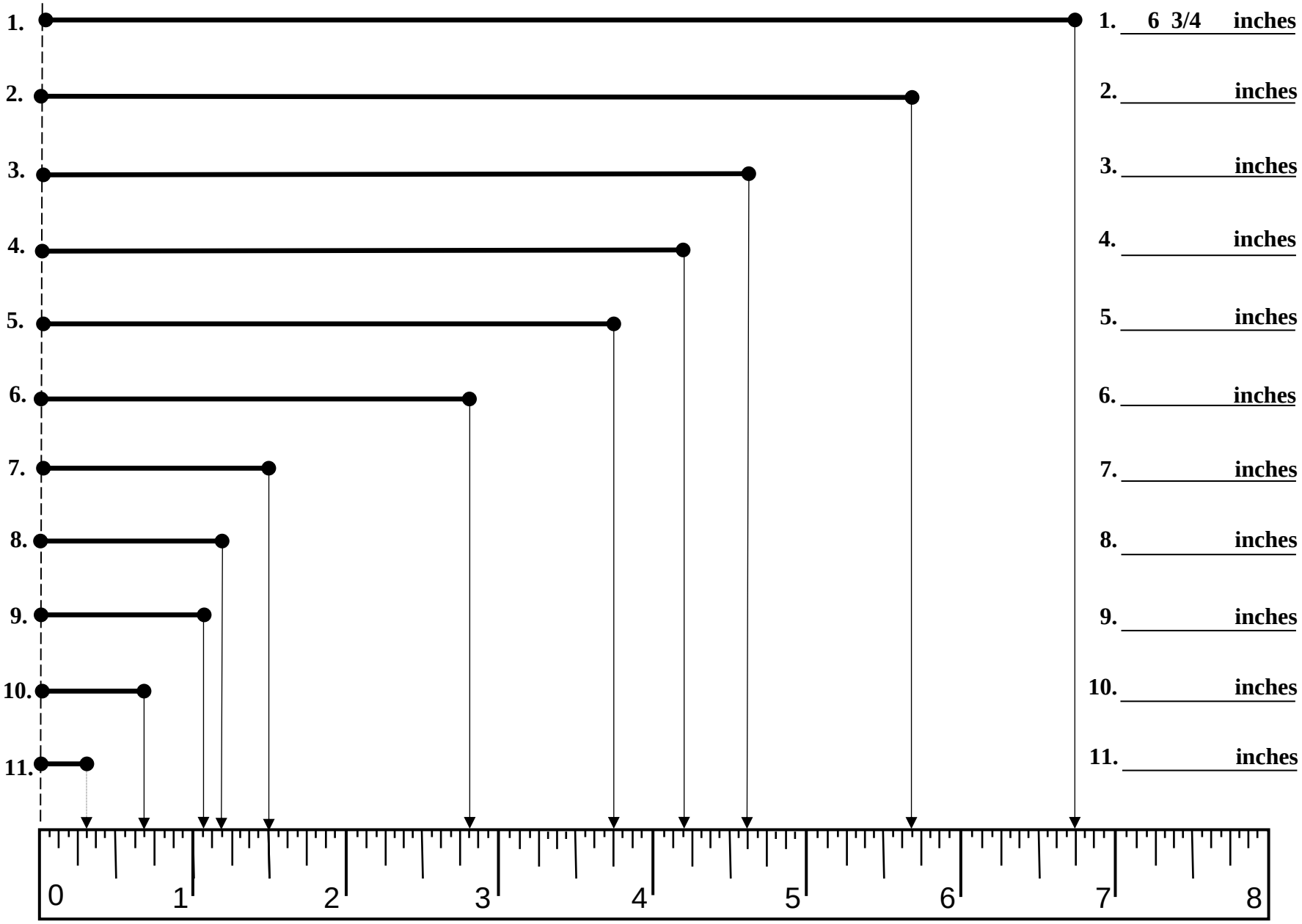
Reading a Customary Ruler in Sixteenths – 8 inch Ruler

-- Version 4 -- **-- Version 4 --** **-- Version 4 --**

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 3/4 inches
2. _____ inches
3. _____ inches
4. _____ inches
5. _____ inches
6. _____ inches
7. _____ inches
8. _____ inches
9. _____ inches
10. _____ inches
11. _____ inches

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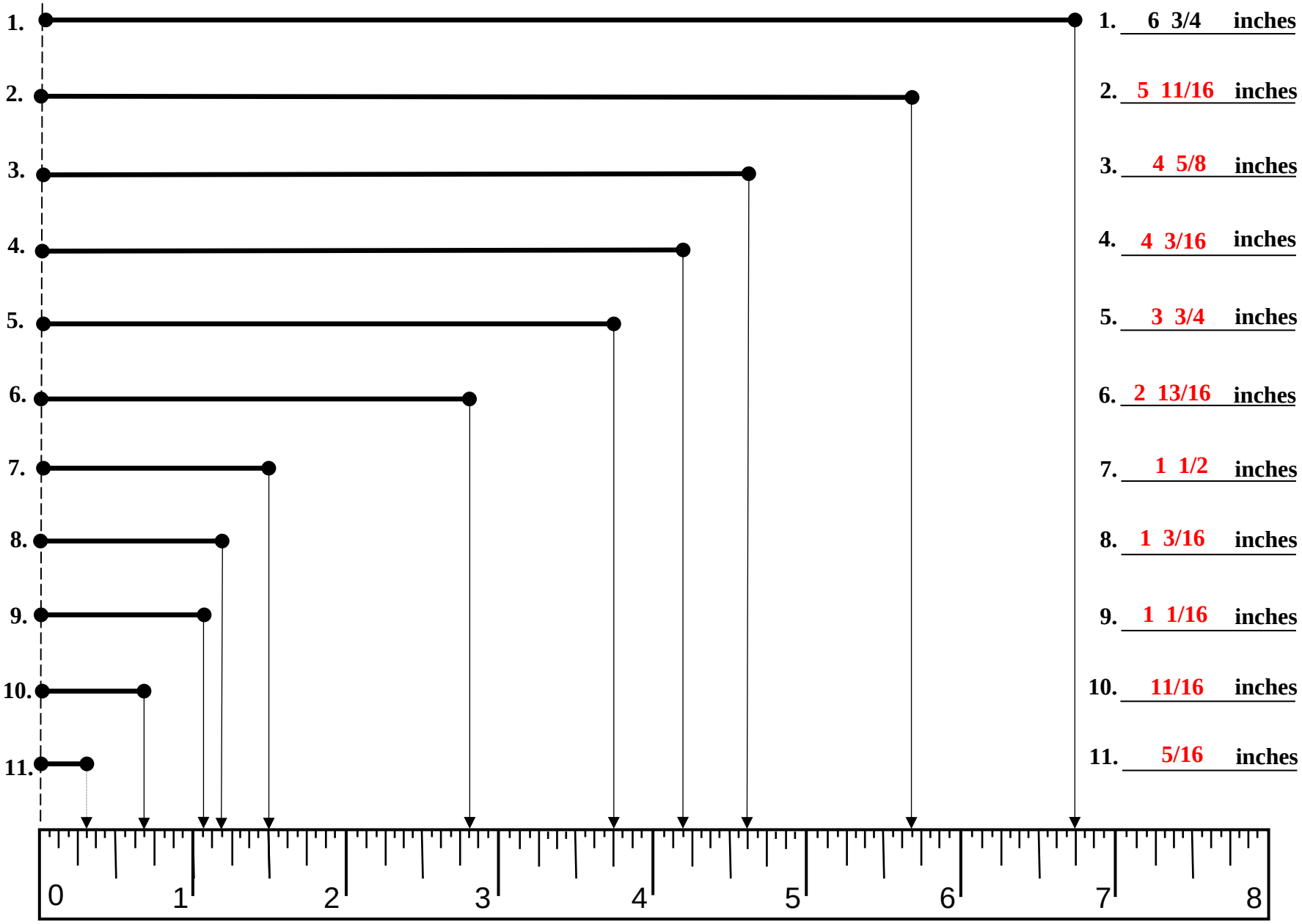
Reading a Customary Ruler in Sixteenths – 8 inch Ruler

-- Version 4 -- -- Version 4 -- -- Version 4 --

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 3/4 inches
2. 5 11/16 inches
3. 4 5/8 inches
4. 4 3/16 inches
5. 3 3/4 inches
6. 2 13/16 inches
7. 1 1/2 inches
8. 1 3/16 inches
9. 1 1/16 inches
10. 11/16 inches
11. 5/16 inches

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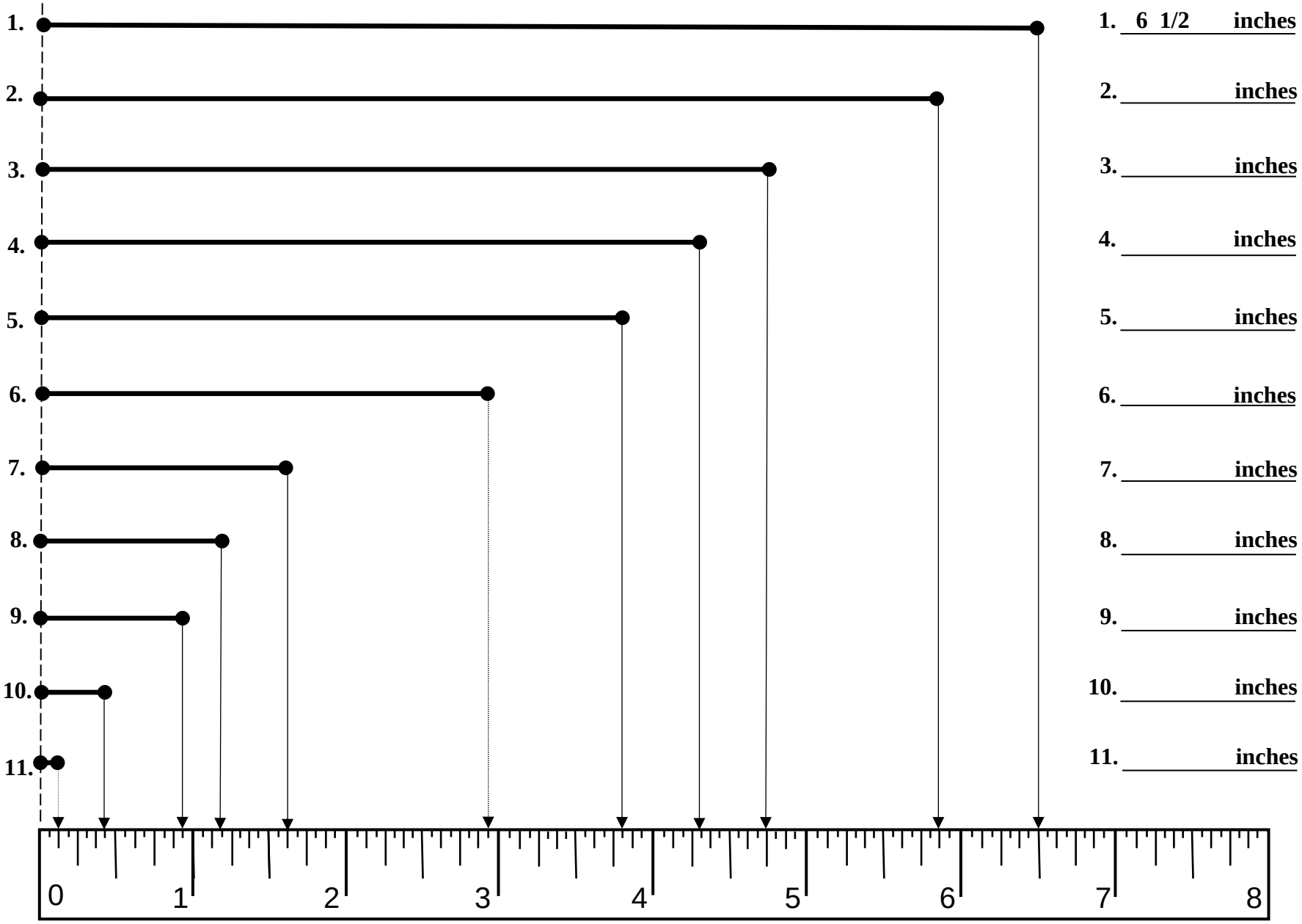
Reading a Customary Ruler in Sixteenths – 8 inch Ruler

-- Version 5 -- **-- Version 5 --** **-- Version 5 --**

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 1/2 inches
2. _____ inches
3. _____ inches
4. _____ inches
5. _____ inches
6. _____ inches
7. _____ inches
8. _____ inches
9. _____ inches
10. _____ inches
11. _____ inches

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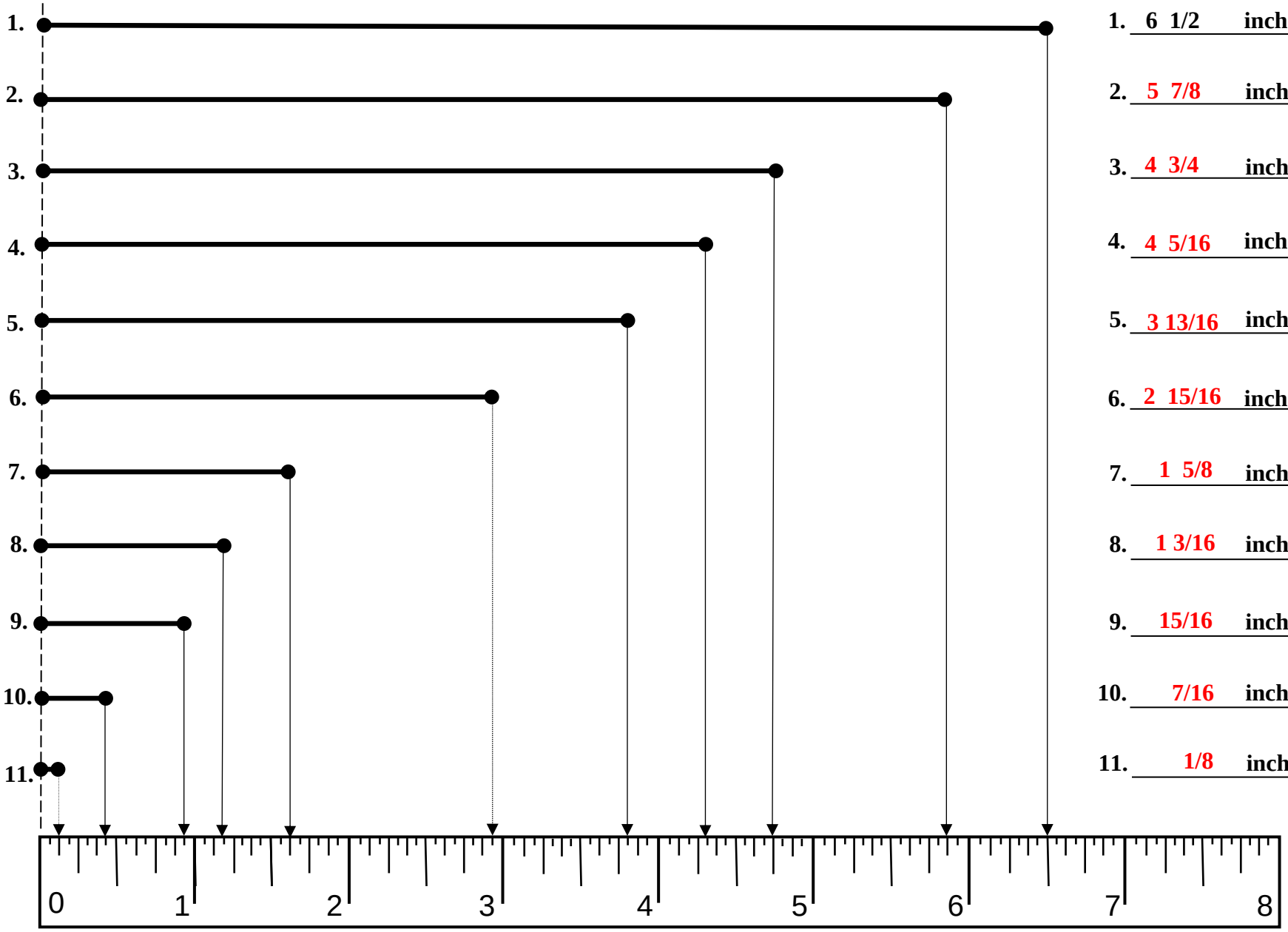
Reading a Customary Ruler in Sixteenths – 8 inch Ruler

-- Version 5 --

-- Version 5 --

-- Version 5 --

Directions: Using the ruler at the bottom of the page, measure the each line segment below and write the correct of the line provided at the right of the page.



1. 6 1/2 inches
2. 5 7/8 inches
3. 4 3/4 inches
4. 4 5/16 inches
5. 3 13/16 inches
6. 2 15/16 inches
7. 1 5/8 inches
8. 1 3/16 inches
9. 15/16 inches
10. 7/16 inches
11. 1/8 inches

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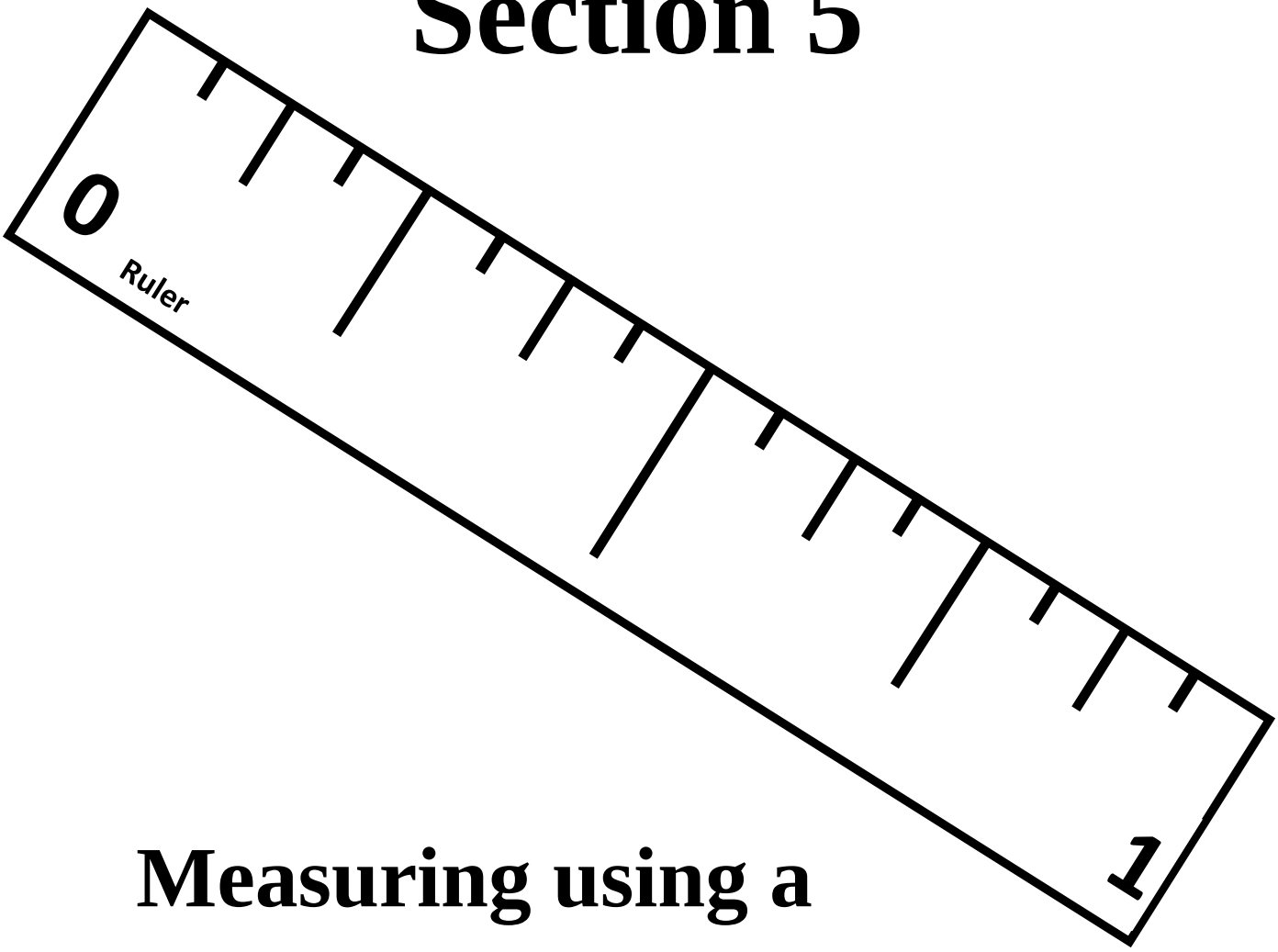
Section 5



Measuring using a Customary Ruler in Halves, Quarters, Eighths and Sixteenths

Practice Sheets

Version 1

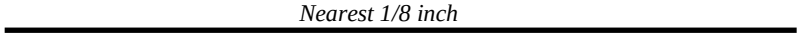
Version 2

Version 3

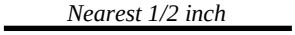
Measuring using a Customary Ruler in Halves, Quarters, Eighths & Sixteenths

-- Version 1 -- **-- Version 1 --** **-- Version 1 --**

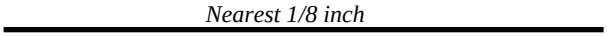
Directions: Measure the length of each line segment below using a customary ruler using the measure accuracy indicated. Write the answer on the line provided at the right of the page.

1. 

1. 4 1/8 inches

2. 

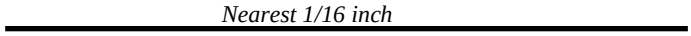
2. inches

3. 

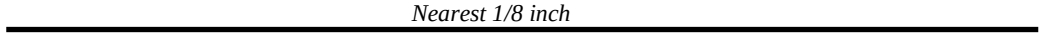
3. inches

4.

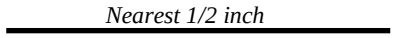
4. inches

5. 

5. inches

6. 

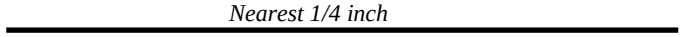
6. inches

7. 

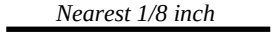
7. inches

8.

8. inches

9. 

9. inches

10. 

10. inches

11.

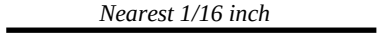
11. inches

12.

12. inches

13.

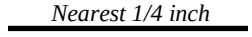
13. inches

14. 

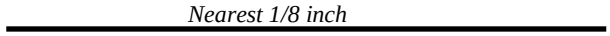
14. inches

15.

15. inches

16. 

16. inches

17. 

17. inches

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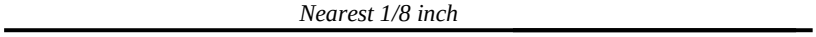
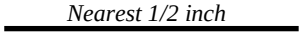
Measuring using a Customary Ruler in Halves, Quarters, Eighths & Sixteenths

-- Version 1 -- **-- Version 1 --** **-- Version 1 --**

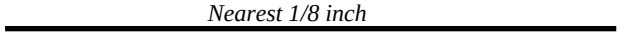
Directions: Measure the length of each line segment below using a customary ruler using the measure accuracy indicated. Write the answer on the line provided at the right of the page.

1. *Nearest 1/8 inch* 

1. 4 1/8 **inches**

2. *Nearest 1/2 inch* 

2. 1 1/2 **inches**

3. *Nearest 1/8 inch* 

3. 3 1/8 **inches**

4. *Nearest 1/2 inch*

4. 1/2 **inches**

5. *Nearest 1/16 inch*

5. 3 7/16 **inches**

6. *Nearest 1/4 inch*

6. 5 1/4 **inches**

7. *Nearest 1/2 inch*

7. 2 **inches**

8. *Nearest 1/4 inch*

8. 3/4 **inches**

9. *Nearest 1/8 inch*

9. 3 3/8 **inches**

10. *Nearest 1/8 inch*

10. 1 3/8 **inches**

11. *Nearest 1/16 inch*

11. 15/16 **inches**

12. *Nearest 1/2 inch*

12. 1 **inches**

13. *Nearest 1/4 inch*

13. 2 3/4 **inches**

14. *Nearest 1/8 inch*

14. 1 7/8 **inches**

15. *Nearest 1/8 inch*

15. 5/8 **inches**

16. *Nearest 1/4 inch*

16. 1 1/4 **inches**

17. *Nearest 1/8 inch*

17. 2 3/8 **inches**

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Measuring using a Customary Ruler in Halves, Quarters, Eighths & Sixteenths

-- Version 2 -- **-- Version 2 --** **-- Version 2 --**

Directions: Measure the length of each line segment below using a customary ruler using the measure accuracy indicated. Write the answer on the line provided at the right of the page.

1. *Nearest 1/8 inch* **1. 7/8 inches**

2. *Nearest 1/4 inch* **2. inches**

3. *Nearest 1/2 inch* **3. inches**

4. *Nearest 1/4 inch* **4. inches**

5. *Nearest 1/16 inch* **5. inches**

6. *Nearest 1/16 inch* **6. inches**

7. *Nearest 1/8 inch* **7. inches**

8. *Nearest 1/16 inch* **8. inches**

9. *Nearest 1/16 inch* **9. inches**

10. *Nearest 1/16 inch* **10. inches**

11. *Nearest 1/16 inch* **11. inches**

12. *Nearest 1/2 inch* **12. inches**

13. *Nearest 1/16 inch* **13. inches**

14. *Nearest 1/8 inch* **14. inches**

15. *Nearest 1/8 inch* **15. inches**

16. *Nearest 1/2 inch* **16. inches**

17. *Nearest 1/4 inch* **17. 5 1/4 inches**

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Measuring using a Customary Ruler in Halves, Quarters, Eighths & Sixteenths

-- Version 2 -- **-- Version 2 --** **-- Version 2 --**

Directions: Measure the length of each line segment below using a customary ruler using the measure accuracy indicated. Write the answer on the line provided at the right of the page.

1. *Nearest 1/8 inch* **1. 7/8 inches**

2. *Nearest 1/4 inch* **2. 3/4 inches**

3. *Nearest 1/2 inch* **3. 2 1/2 inches**

4. *Nearest 1/4 inch* **4. 1 1/4 inches**

5. *Nearest 1/16 inch* **5. 3 1/16 inches**

6. *Nearest 1/16 inch* **6. 1 5/16 inches**

7. *Nearest 1/8 inch* **7. 3 5/8 inches**

8. *Nearest 1/16 inch* **8. 1 7/16 inches**

9. *Nearest 1/16 inch* **9. 1 3/16 inches**

10. *Nearest 1/16 inch* **10. 2 5/16 inches**

11. *Nearest 1/16 inch* **11. 15/16 inches**

12. *Nearest 1/2 inch* **12. 1 inches**

13. *Nearest 1/16 inch* **13. 1 11/16 inches**

14. *Nearest 1/8 inch* **14. 1 7/8 inches**

15. *Nearest 1/8 inch* **15. 5/8 inches**

16. *Nearest 1/2 inch* **16. 1/2 inches**

17. *Nearest 1/4 inch* **17. 5 1/4 inches**

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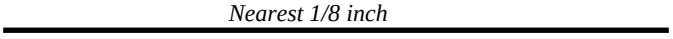
Measuring using a Customary Ruler in Halves, Quarters, Eighths & Sixteenths

-- Version 3 -- **-- Version 3 --** **-- Version 3 --**

Directions: Measure the length of each line segment below using a customary ruler using the measure accuracy indicated. Write the answer on the line provided at the right of the page.

1.  *Nearest 1/8 inch* **1. 3 3/8 inches**

2. *Nearest 1/2 inch* **2. inches**

3. *Nearest 1/4 inch* **3. inches**

4. *Nearest 1/2 inch* **4. inches**

5. *Nearest 1/16 inch* **5. inches**

6. *Nearest 1/8 inch* **6. inches**

7. *Nearest 1/2 inch* **7. inches**

8. *Nearest 1/4 inch* **8. inches**

9. *Nearest 1/2 inch* **9. inches**

10. *Nearest 1/8 inch* **10. inches**

11. *Nearest 1/16 inch* **11. inches**

12. *Nearest 1/8 inch* **12. inches**

13. *Nearest 1/8 inch* **13. inches**

14. *Nearest 1/8 inch* **14. inches**

15. *Nearest 1/8 inch* **15. inches**

16. *Nearest 1/2 inch* **16. inches**

17. *Nearest 1/8 inch* **17. inches**

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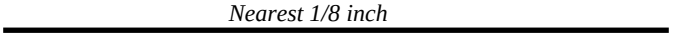
Measuring using a Customary Ruler in Halves, Quarters, Eighths & Sixteenths

-- Version 3 -- -- Version 3 -- -- Version 3 --

Directions: Measure the length of each line segment below using a customary ruler using the measure accuracy indicated. Write the answer on the line provided at the right of the page.

1. 

1. 3 3/8 inches

2.

2. 2 inches

3.

3. 2 3/4 inches

4.

4. 1/2 inches

5.

5. 3 9/16 inches

6.

6. 4 7/8 inches

7.

7. 2 inches

8.

8. 3/4 inches

9.

9. 4 inches

10.

10. 1 5/8 inches

11.

11. 15/16 inches

12.

12. 1 1/8 inches

13.

13. 2 3/8 inches

14.

14. 1 7/8 inches

15.

15. 5/8 inches

16.

16. 1 1/2 inches

17.

17. 3 5/8 inches

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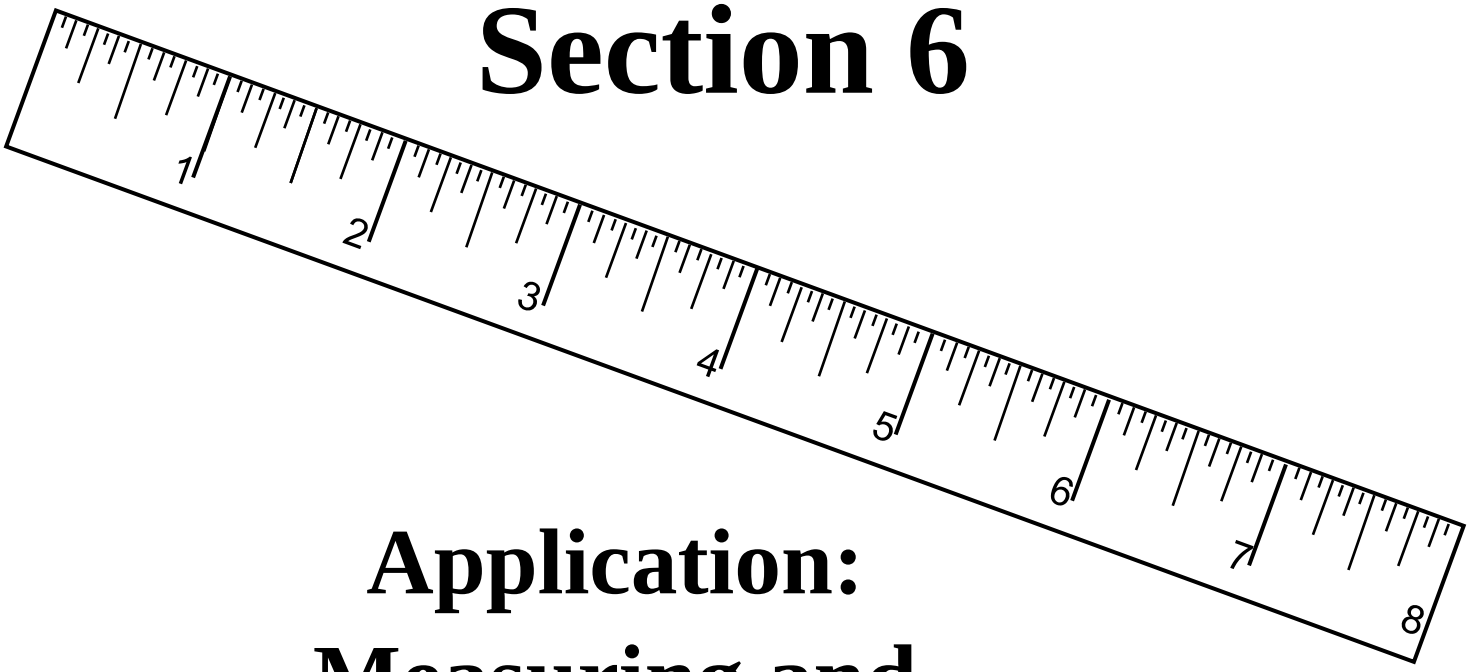
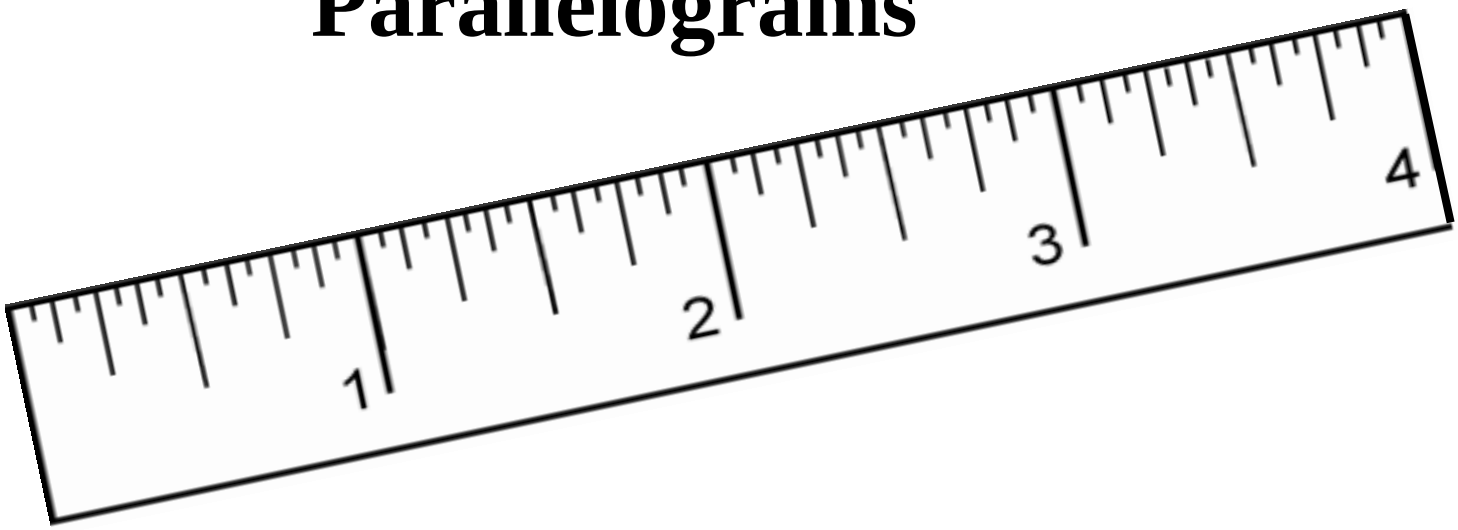
Section 6



Application: Measuring and Calculating Perimeter and Area of Parallelograms



Section 6

Application: Perimeter

Version A

Version B

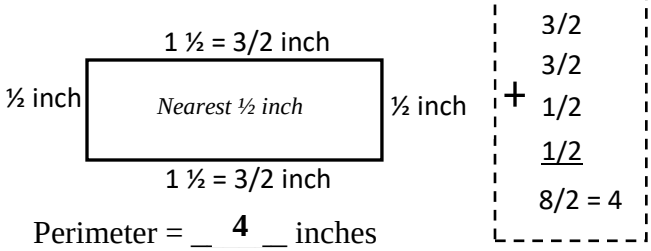
Version C

Application: Measuring and Calculating PERIMETER of Parallelograms

-- Version A -- **-- Version A --** **-- Version A --**

Directions: Measure the side of each parallelogram below using a customary ruler using the measure accuracy indicated. Compute the perimeter of each polygon and write the answer on the line provided.

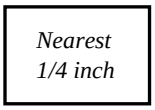
1.



3/2
3/2
+ 1/2
1/2
8/2 = 4

Perimeter = _ **4** _ inches

2.

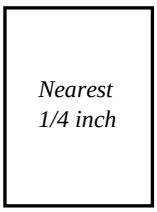


Perimeter = _____ inches

3.

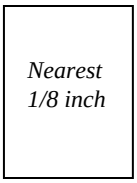
Perimeter = _____ inches

4.



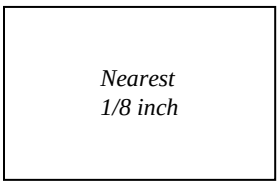
Perimeter = _____ inches

5.



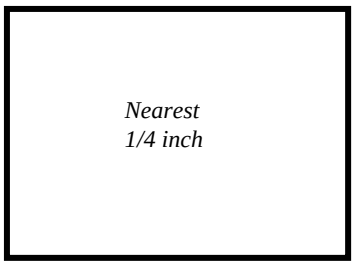
Perimeter = _____ inches

6.



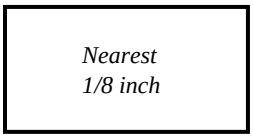
Perimeter = _____ inches

7.



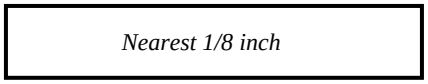
Perimeter = _____ inches

8.



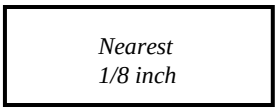
Perimeter = _____ inches

9.



Perimeter = _____ inches

10.



Perimeter = _____ inches

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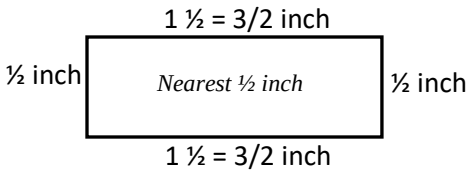
Application: Measuring and Calculating PERIMETER of Parallelograms

Directions: Measure the side of each parallelogram below using a customary ruler using the measure accuracy indicated. Compute the perimeter of each polygon and write the answer on the line provided.

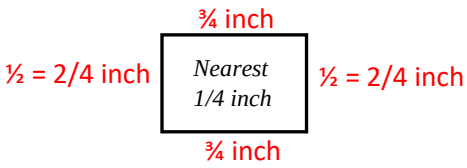
1.



3/2
3/2
+ 1/2
1/2
8/2 = 4

Perimeter = _ **4** _ inches

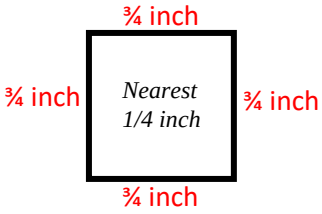
2.



Perimeter = **10/4** inches

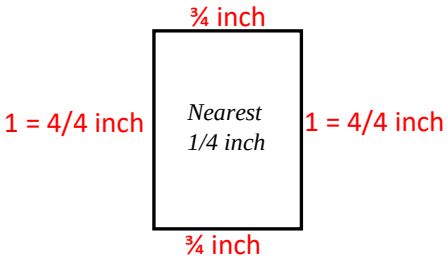
2 2/4 = 2 1/2

3.



Perimeter = **12/4 = 3** inches

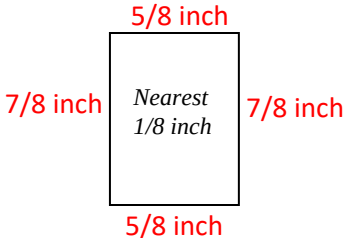
4.



Perimeter = **14/4** inches

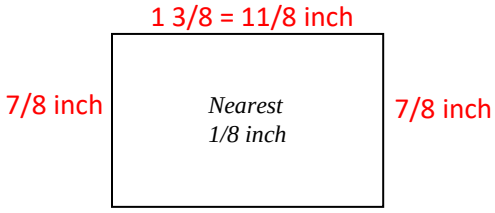
3 2/4 = 3 1/2

5.



Perimeter = **24/8 = 3** inches

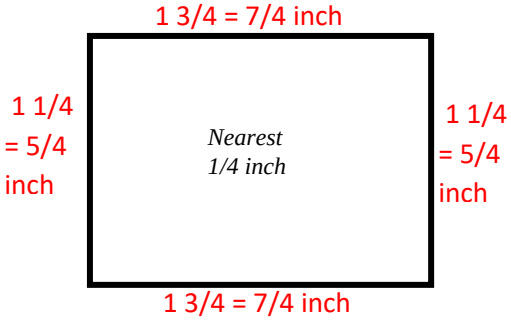
6.



Perimeter = **36/8** inches

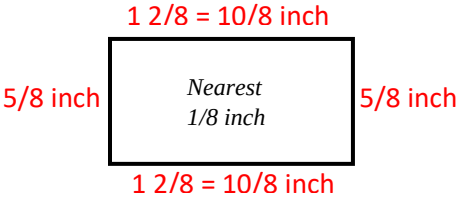
4 4/8 = 4 1/2

7.



Perimeter = **24/4 = 6** inches

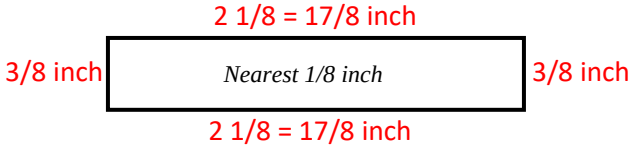
8.



Perimeter = **30/8** inches

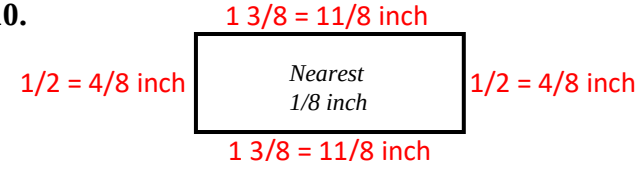
3 6/8 = 3 3/4

9.



Perimeter = **40/8 = 5** inches

10.



Perimeter = **30/8** inches

3 6/8 = 3 3/4

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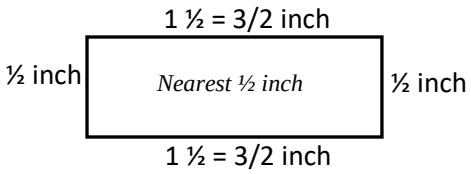
Application: Measuring and Calculating PERIMETER of Parallelograms

-- Version B -- **-- Version B --** **-- Version B --**

Directions: Measure the side of each parallelogram below using a customary ruler using the measure accuracy indicated. Compute the perimeter of each polygon and write the answer on the line provided.

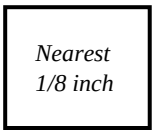
1.



3/2
3/2
+ 1/2
1/2
8/2 = 4

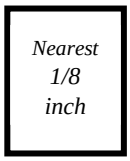
Perimeter = _ **4** _ inches

2.



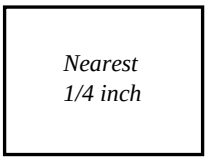
Perimeter = _____ inches

3.



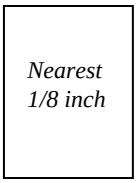
Perimeter = _____ inches

4.



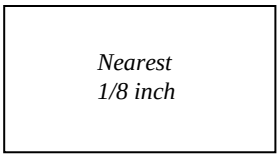
Perimeter = _____ inches

5.



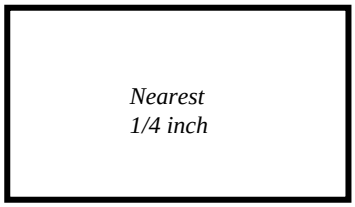
Perimeter = _____ inches

6.



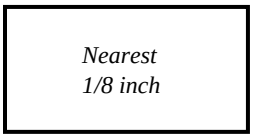
Perimeter = _____ inches

7.



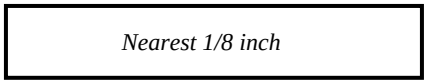
Perimeter = _____ inches

8.



Perimeter = _____ inches

9.



Perimeter = _____ inches

10.

Perimeter = _____ inches

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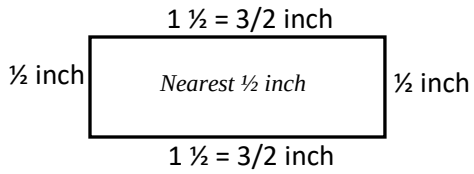
Application: Measuring and Calculating PERIMETER of Parallelograms

-- Version B -- -- Version B -- -- Version B --

Directions: Measure the side of each parallelogram below using a customary ruler using the measure accuracy indicated. Compute the perimeter of each polygon and write the answer on the line provided.

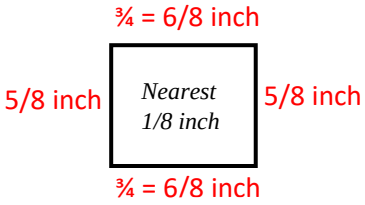
1.



3/2
3/2
+ 1/2
1/2
8/2 = 4

Perimeter = _ **4** _ inches

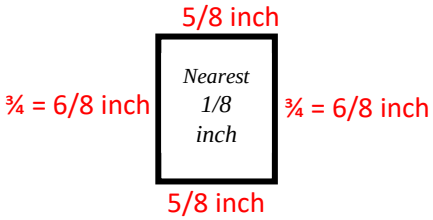
2.



Perimeter = _ **22/8** _ inches

2 6/8 = 2 3/4

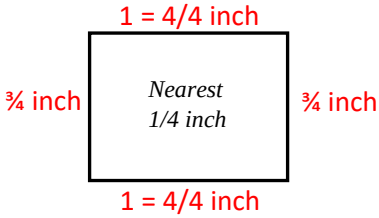
3.



Perimeter = _ **22/8** _ inches

2 6/8 = 2 3/4

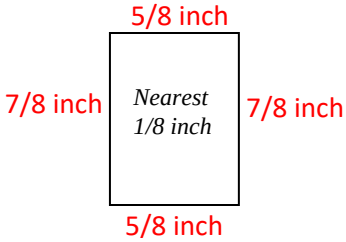
4.



Perimeter = _ **14/4** _ inches

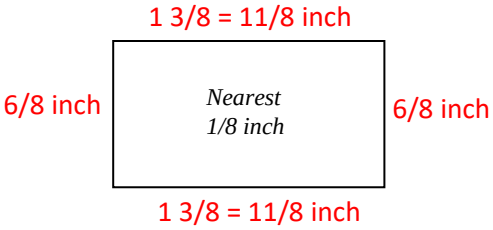
3 2/4 = 3 1/2

5.



Perimeter = **24/8 = 3** inches

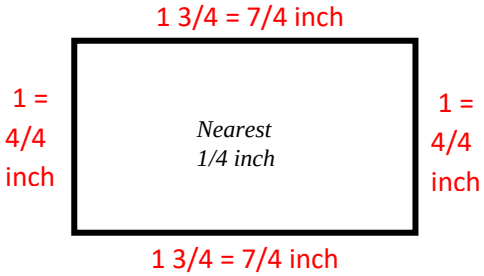
6.



Perimeter = _ **34/8** _ inches

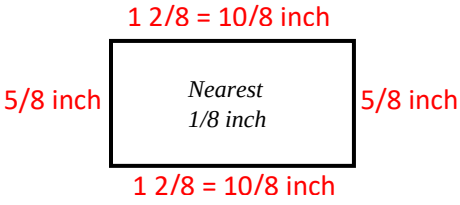
4 2/8 = 4 1/4

7.



Perimeter = **22/4 = 5 1/2** inches

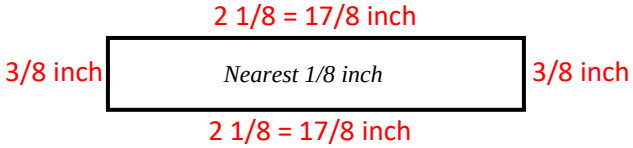
8.



Perimeter = **30/8** inches

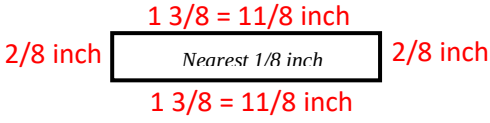
3 6/8 = 3 3/4

9.



Perimeter = **40/8 = 5** inches

10.



Perimeter = **26/8** inches

3 2/8 = 3 1/4

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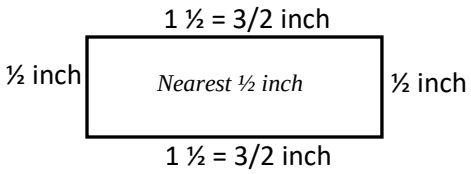
Application: Measuring and Calculating PERIMETER of Parallelograms

-- Version C -- **-- Version C --** **-- Version C --**

Directions: Measure the side of each parallelogram below using a customary ruler using the measure accuracy indicated. Compute the perimeter of each polygon and write the answer on the line provided.

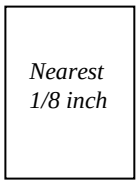
1.



3/2
3/2
+ 1/2
1/2
8/2 = 4

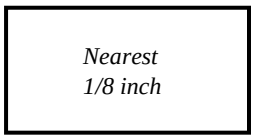
Perimeter = _ **4** _ inches

2.



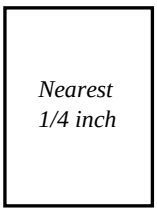
Perimeter = _____ inches

3.



Perimeter = _____ inches

4.

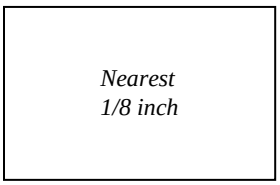


Perimeter = _____ inches

5.

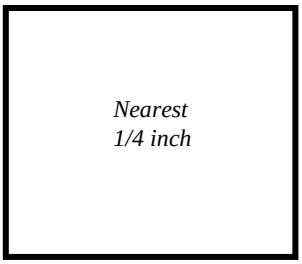
Perimeter = _____ inches

6.



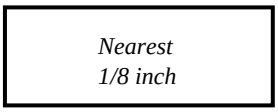
Perimeter = _____ inches

7.



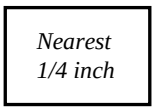
Perimeter = _____ inches

8.



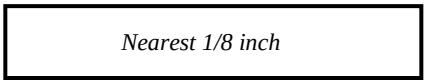
Perimeter = _____ inches

9.



Perimeter = _____ inches

10.



Perimeter = _____ inches

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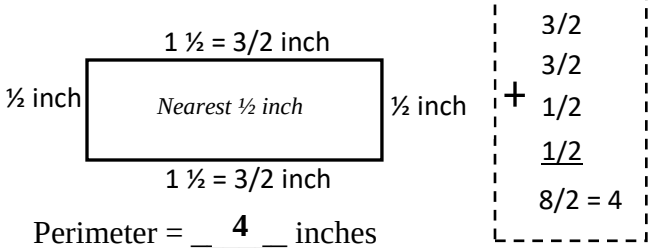
Application: Measuring and Calculating PERIMETER of Parallelograms

-- Version C -- **-- Version C --** **-- Version C --**

Directions: Measure the side of each parallelogram below using a customary ruler using the measure accuracy indicated. Compute the perimeter of each polygon and write the answer on the line provided.

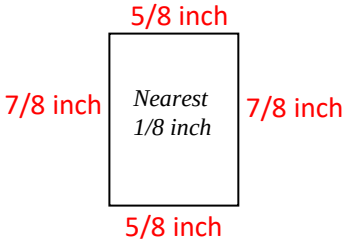
1.



3/2
3/2
+ 1/2
1/2
8/2 = 4

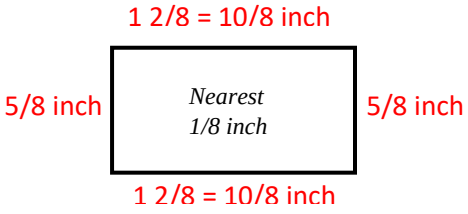
Perimeter = _ **4** _ inches

2.



Perimeter = **24/8 = 3** inches

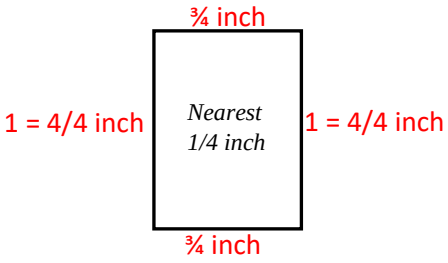
3.



Perimeter = **30/8** inches

3 6/8 = 3 3/4

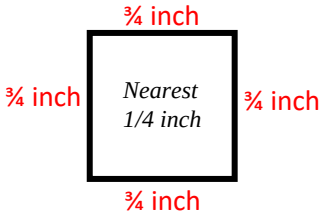
4.



Perimeter = **14/4** inches

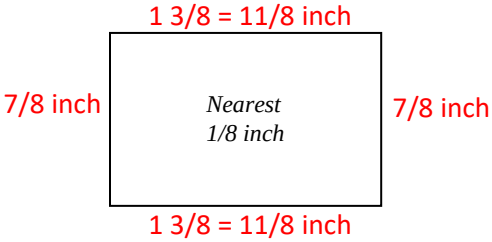
3 2/4 = 3 1/2

5.



Perimeter = **12/4 = 3** inches

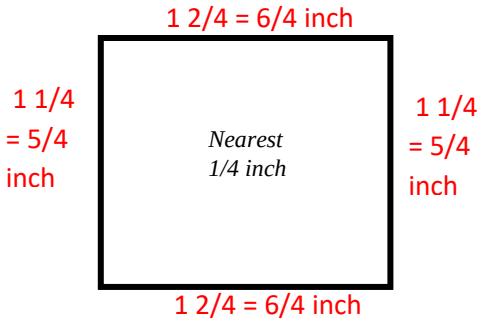
6.



Perimeter = **36/8** inches

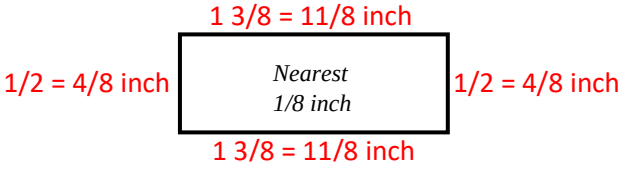
4 4/8 = 4 1/2

7.



Perimeter = **22/4 = 5 1/2** inches

8.



Perimeter = **30/8** inches

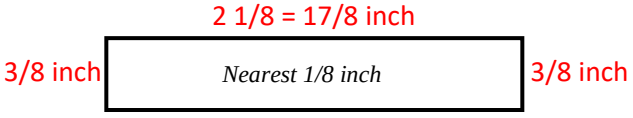
3 6/8 = 3 3/4

9.

Perimeter = **10/4** inches

2 2/4 = 2 1/2

10.



Perimeter = **40/8 = 5** inches

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Section 6

Application:

Area

Version D

Version E

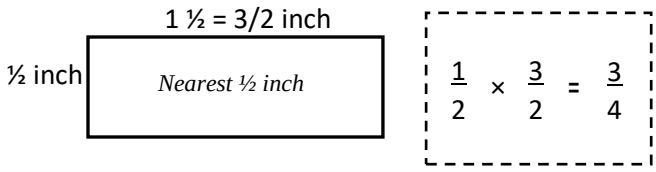
Version F

Application: Measuring and Calculating AREA of Parallelograms

-- Version D -- **-- Version D --** **-- Version D --**

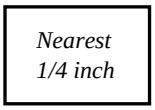
Directions: Measure the side of each parallelogram below using a customary ruler using the measure accuracy indicated. Compute the area of each polygon and write the answer on the line provided.

1.



Area = __ 3/4 ___ square inches

2.

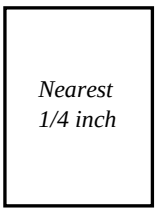


Area = _____ inches^2

3.

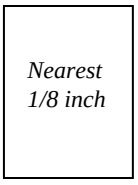
Area = _____ square inches

4.



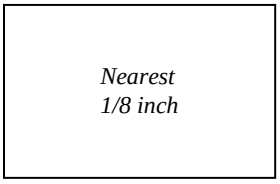
Area = _____ square inches

5.



Area = _____ square inches

6.

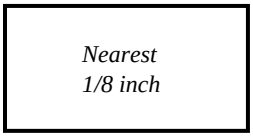


Area = _____ inches^2

7.

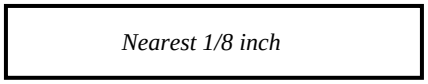
Area = _____ inches^2

8.



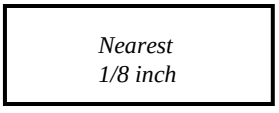
Area = _____ square inches

9.



Area = _____square inches

10.



Area = _____ inches^2

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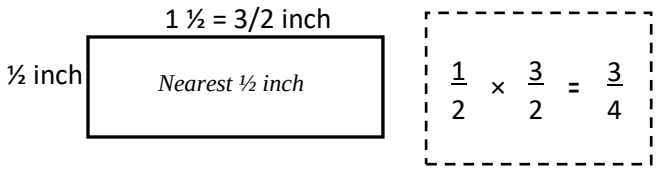
Application: Measuring and Calculating AREA of Parallelograms

-- Version D -- **-- Version D --** **-- Version D --**

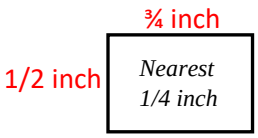
Directions: Measure the side of each parallelogram below using a customary ruler using the measure accuracy indicated. Compute the area of each polygon and write the answer on the line provided.

1.



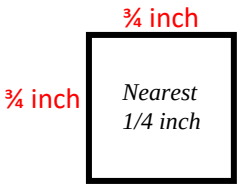
Area = 3/4 square inches

2.



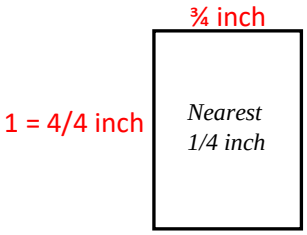
Area = 3/8 inches^2

3.



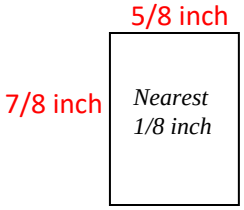
Area = 9/16 square inches

4.



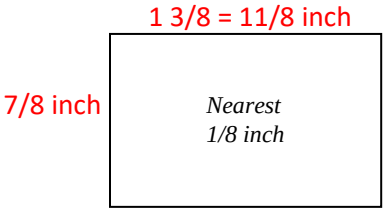
Area = 3/4 square inches

5.



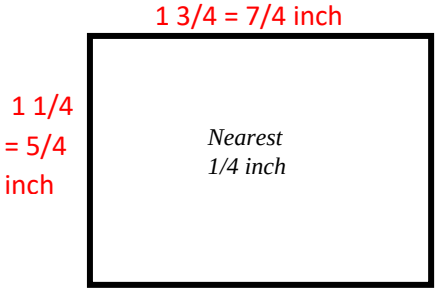
Area = 35/64 square inches

6.



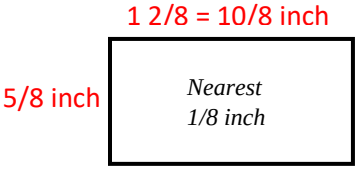
Area = 77/64 inches^2

7.



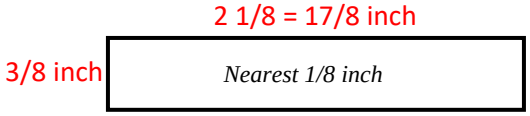
Area = 35/16 = 2 3/16 inches^2

8.



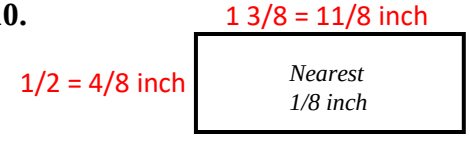
Area = 25/32 square inches

9.



Area = 51/64 square inches

10.



Area = 44/64 = 11/16 inches^2

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Application: Measuring and Calculating AREA of Parallelograms

-- Version E -- **-- Version E --** **-- Version E --**

Directions: Measure the side of each parallelogram below using a customary ruler using the measure accuracy indicated. Compute the area of each polygon and write the answer on the line provided.

1.

1 ½ = 3/2 inch

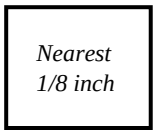
½ inch

Nearest ½ inch

$\frac{1}{2} \times \frac{3}{2} = \frac{3}{4}$

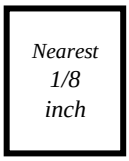
Area = ___ $\frac{3}{4}$ ___ inches^2

2.



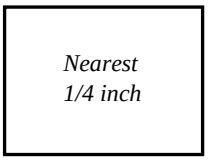
Area = _____ inches^2

3.



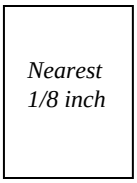
Area = _____ square inches

4.



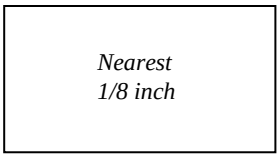
Area = _____ inches^2

5.



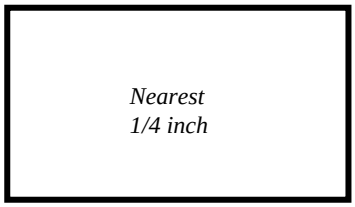
Area = _____ inches^2

6.



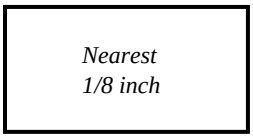
Area = _____ square inches

7.



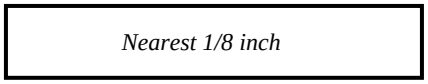
Area = _____ square inches

8.



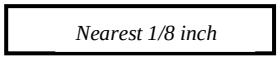
Area = _____ inches^2

9.



Area = _____ inches^2

10.



Area = _____ square inches

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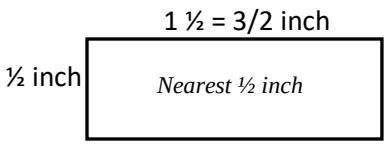
Application: Measuring and Calculating AREA of Parallelograms

-- Version E -- **-- Version E --** **-- Version E --**

Directions: Measure the side of each parallelogram below using a customary ruler using the measure accuracy indicated. Compute the area of each polygon and write the answer on the line provided.

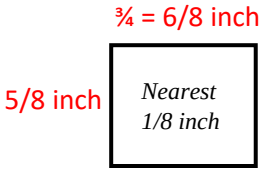
1.



$\frac{1}{2} \times \frac{3}{2} = \frac{3}{4}$

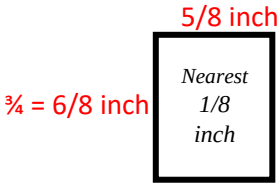
Area = ___ 3/4 ___ inches^2

2.



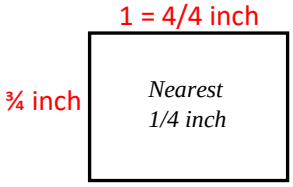
Area = _ **30/64 = 15/32** _ inches^2

3.



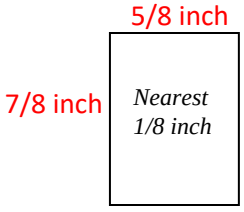
Area = _ **30/64 = 15/32** _ square inches

4.



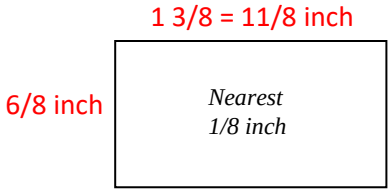
Area = _ **12/16 = 3/4** _ inches^2

5.



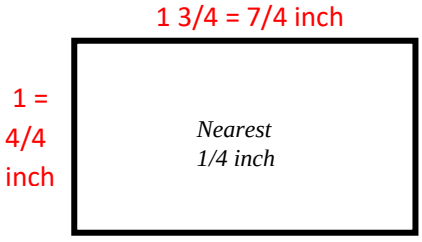
Area = _ **35/64** _ inches^2

6.



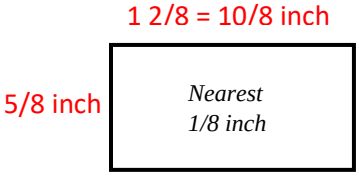
Area = _ **66/64 = 1 1/32** _ square inches

7.



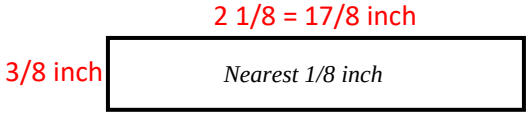
Area = _ **28/16 = 1 3/4** _ square inches

8.



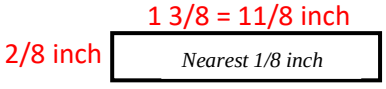
Area = _ **50/64 = 25/32** _ inches^2

9.



Area = _ **51/64** _ inches^2

10.



Area = _ **22/64 = 11/32** _ square inches

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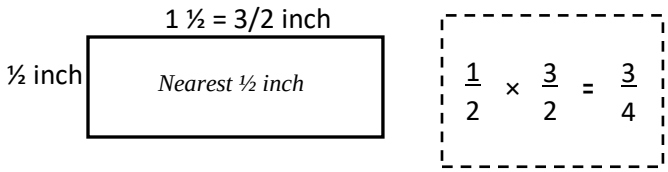
Application: Measuring and Calculating AREA of Parallelograms

-- Version F -- **-- Version F --** **-- Version F --**

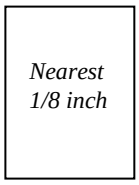
Directions: Measure the side of each parallelogram below using a customary ruler using the measure accuracy indicated. Compute the Area of each polygon and write the answer on the line provided.

1.



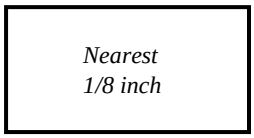
Area = $\frac{3}{4}$ inches^2

2.



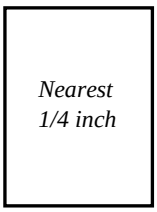
Area = _____ inches^2

3.



Area = _____ inches^2

4.

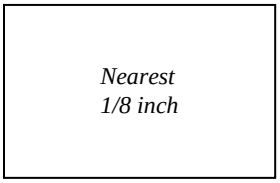


Area = _____ square inches

5.

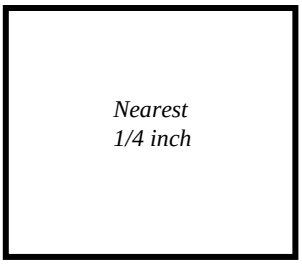
Area = _____ inches^2

6.



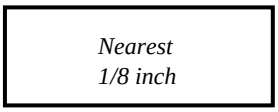
Area = _____ square inches

7.



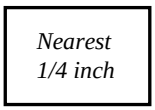
Area = _____ inches^2

8.



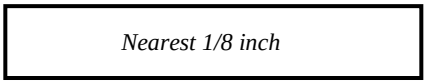
Area = _____ square inches

9.



Area = _____ square inches

10.



Area = _____ inches^2

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Application: Measuring and Calculating AREA of Parallelograms

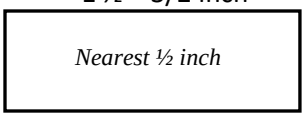
-- Version F -- **-- Version F --** **-- Version F --**

Directions: Measure the side of each parallelogram below using a customary ruler using the measure accuracy indicated. Compute the Area of each polygon and write the answer on the line provided.

1.

1 ½ = 3/2 inch

½ inch



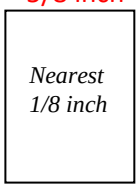
$\frac{1}{2} \times \frac{3}{2} = \frac{3}{4}$

Area = $\frac{3}{4}$ inches^2

2.

5/8 inch

7/8 inch

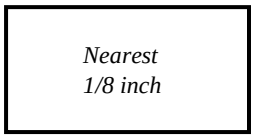


Area = **35/64** inches^2

3.

1 2/8 = 10/8 inch

5/8 inch



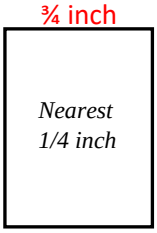
Area = **50/64** inches^2

25/32

4.

¾ inch

1 = 4/4 inch



Area = **12/16** square inches

3/4

5.

¾ inch

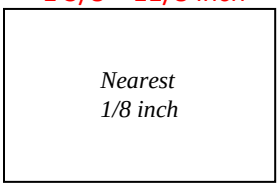
¾ inch

Area = **9/16** inches^2

6.

1 3/8 = 11/8 inch

7/8 inch



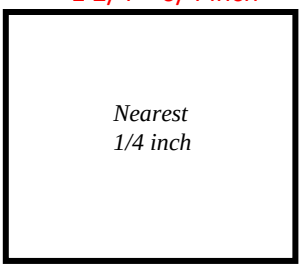
Area = **77/64** square inches

1 13/64

7.

1 2/4 = 6/4 inch

1 1/4 = 5/4 inch

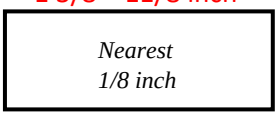


Area = **30/16 = 1 7/8** inches^2

8.

1 3/8 = 11/8 inch

1/2 = 4/8 inch

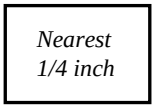


Area = **11/16** square inches

9.

¾ inch

½ = 2/4 inch

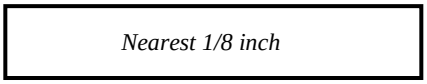


Area = **3/8** square inches

10.

2 1/8 = 17/8 inch

3/8 inch



Area = **51/64** inches^2

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