CORE CURRICULUM

Introduction to Construction Math 00102-15

Session 2: Decimals; Taking Measurements

Session Two Objectives

When trainees have completed this session, they should be able to do the following:

3. Describe the decimal system and explain how to work with decimals.
   a. Describe decimals and their place values.
   b. Demonstrate the ability to add, subtract, multiply, and divide decimals.
   c. Demonstrate the ability to convert between decimals, fractions, and percentages.
4. Identify various tools used to measure length and show how they are used.
   a. Identify and demonstrate how to use rulers.
   b. Identify and demonstrate how to use measuring tapes.

Section 3.1.0 – Decimals

Remember that place values extend in both directions far beyond what is shown here. Decimal values less than 1 are commonly written with a zero to the left of the decimal point, like this:

0.56

5	,	3	1	6	,	2	4	7	.	4	2	9	6	3	5
MILLIONS		HUNDRED THOUSANDS	TEN THOUSANDS	THOUSANDS		HUNDREDS	TENS	ONES		TENTHS	HUNDREDTHS	THOUSANDTHS	TEN-THOUSANDTHS	HUNDRED-THOUSANDTHS	MILLIONTHS

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Section 3.1.1 – Decimals

ROUNDING

The number 212.7659574 can be rounded to any place value needed. See if each of these steps appear to be correct:

212.765957
212.76596
212.766
212.77
212.8
213
210
200

Section 3.1.3 – Decimals

Identify the words that represent the proper way to speak the decimal value shown.

3. 2.5 = _____.

   a. two and five-tenths

   b. two and five-hundredths

   c. two and five-thousandths

   d. twenty-five-hundredths

Section 3.1.3 – Decimals

Select the answer that places the decimals in order from smallest to largest.

6. 0.400, 0.004, 0.044, and 0.404

    a. 0.400, 0.004, 0.044, 0.404

    b. 0.004, 0.044, 0.404, 0.400

    c. 0.004, 0.044, 0.400, 0.404

    d. 0.404, 0.044, 0.400, 0.004

Sections 3.2.2 and 3.2.3 – Decimals

MULTIPLYING DECIMALS

- Set the problem up the same as you would for multiplying whole numbers. Multiply as usual.

- Count the number of decimal places in **both** numbers. Count from right to left and insert the decimal point.

$$\begin{array}{r} 4.5 \\ \times\ \ 7 \\ \hline 31.5 \end{array}$$

- Here is an example of a problem with a number of decimal places:

$$\begin{array}{r} 0.507 \\ \times\ 0.022 \\ \hline 1014 \\ 10140 \\ +\ 000 \\ \hline 11154 \end{array} = 0.011154$$

Sections 3.2.2 and 3.2.3 – Decimals

DIVIDING DECIMALS

- With a decimal point in the dividend only, transfer it straight up to the line above:

$$22\overline{)44.5}$$

- When there is a decimal point in the divisor, move it to the right to make a whole number. Then move the decimal point in the dividend the same number of places and transfer it up to the line above. In this example, 0.22 is turned into 22 by moving the decimal point two places to the right. Then the decimal point is moved two places to the right in the dividend to compensate.

```
          20227.2
22)4450.00.0
   -44
     0050
    -0044
      00060
     -00044
       000160
      -000154
        0000060
       -0000044
         0000016r
```

Section 3.2.5 – Decimals

2. 1.82 + 3.41 + 5.25 = **10.48**

5. Yesterday, a lumber yard contained 6.7 tons of wood. Since then, 2.3 tons were removed. How many tons of wood remain?

    a.   3.4 tons

    b.   4.4 tons

    c.   5.4 tons

    d.   6.4 tons

The tank is half full. As a fraction, it is 1⁄2 full. As a decimal, it is written as 0.50. To change the decimal to a percentage, simply move the decimal point two places to the right. The result is 50%.

100-GALLON CAPACITY

50 GALLONS OF LIQUID
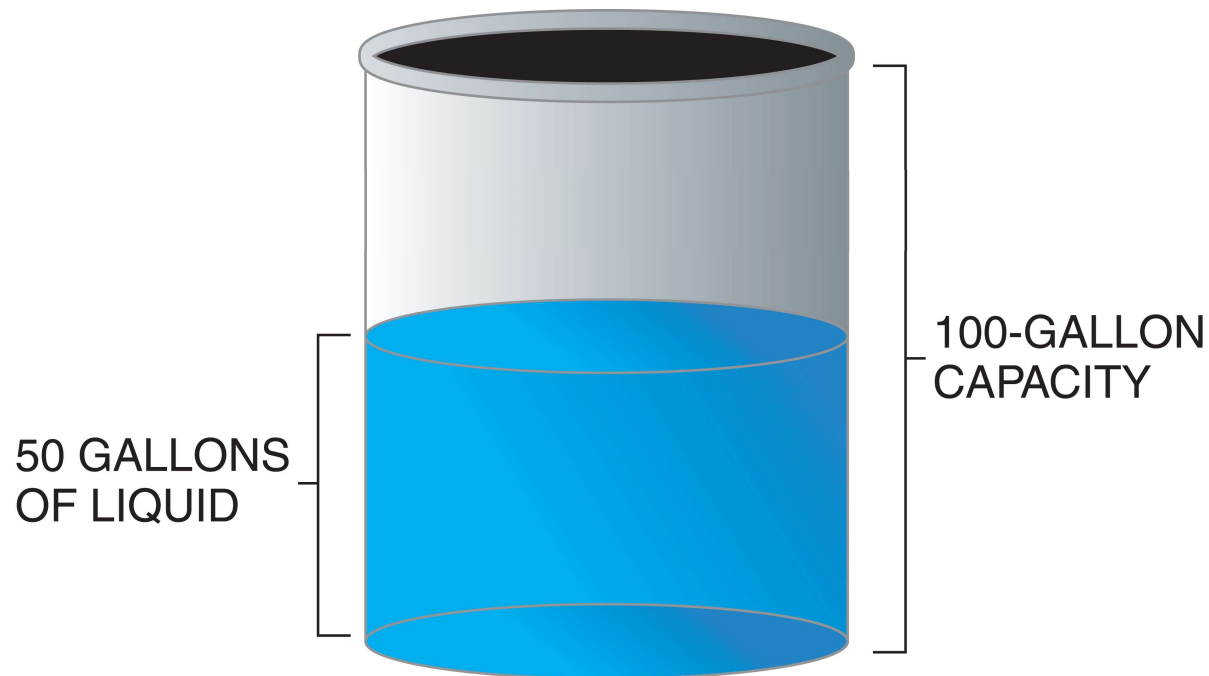
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CONVERTING FRACTIONS TO DECIMALS

- Remember that a fraction is merely a division problem written another way.
- Divide the numerator by the denominator. For the fraction 3/4, it would be written as:

$$4\overline{)3.0}$$

- Move the decimal point to the upper line and complete the problem:

$$
\begin{array}{r}
.75 \\
4\overline{)3.00} \\
-2.8 \\
\hline
0.20 \\
-0.20 \\
\hline
0.00
\end{array}
$$

Sections 3.3.3 and 3.3.4 – Decimals and Fractions

CONVERTING DECIMALS TO FRACTIONS

Step 1 Say the decimal in words.

0.125 is spoken as one hundred twenty-five thousandths

Step 2 Write the decimal as a fraction, just like it was spoken.

0.125 written as a fraction is 125⁄1000

Step 3 Reduce the fraction to its lowest terms.

$$\frac{125}{1000} = \frac{125}{1000} \div \frac{125}{125} = \frac{1}{8}$$

Sections 3.3.3 and 3.3.4 – Decimals and Fractions

CONVERTING INCHES TO DECIMAL EQUIVALENTS

- Convert 3 inches to a fraction. Since a foot has 12 inches, the fraction is 3/12.

- Reduce to lower terms of ¼ inch, or simply divide as is for a decimal equivalent.

$$
\begin{array}{r}
0.25 \\
4\overline{)1.00} \\
-0.8 \\
\hline
0.20 \\
-0.20 \\
\hline
0.00
\end{array}
$$

Section 3.3.5 – Conversions

Convert the following fractions to their decimal equivalents without using a calculator.

6. 1⁄4 = __0.25__

7. 3⁄4 = __0.75__

Convert the following measurements to a decimal value in feet. Round the answer to the nearest hundredth.

16. 9 inches = __0.75__ feet

17. 10 inches = __0.83__ feet

Sections 4.1.1 and 4.1.2 – Measuring

1/16" increments are common on English rulers. Smaller increments are common on precision rulers. Centimeters and millimeters are commonly used on metric measuring tapes and rulers.

¾"
⅛"
¼"
1"
½"
1/16"
1
2
IN.

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0.4 CENTIMETERS
(OR 4 MILLIMETERS)

2.7 CENTIMETERS
(OR 27 MILLIMETERS)

CM   1   2   3   4

CENTIMETER
MARKS
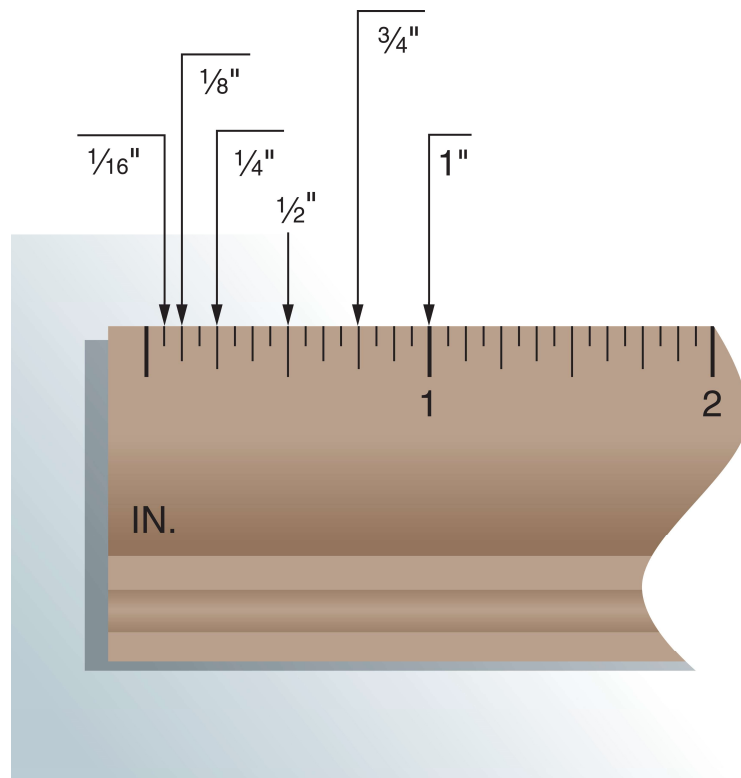
MILLIMETER
MARKS
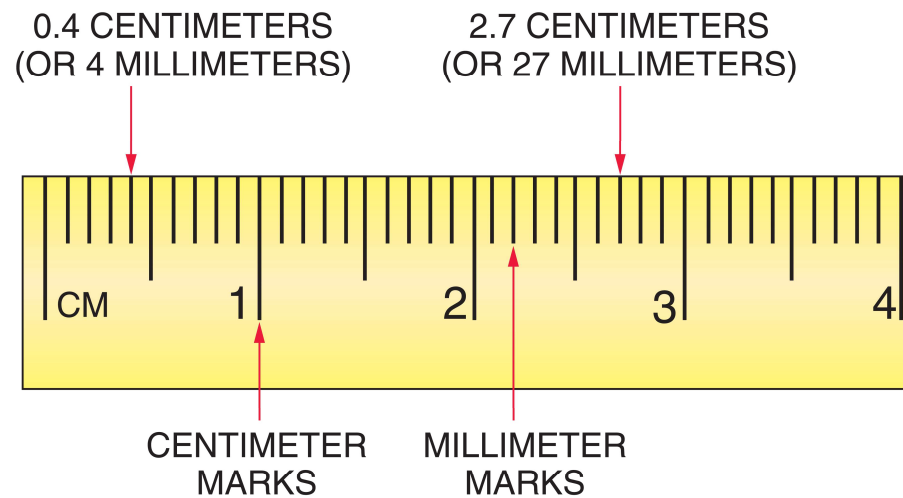
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Section 4.1.3 – Measuring

1. __½"__   2. __1-7/8"__   3. __2-3/4"__   4. __3-3/4"__   5. __4-5/8"__

1/8THS
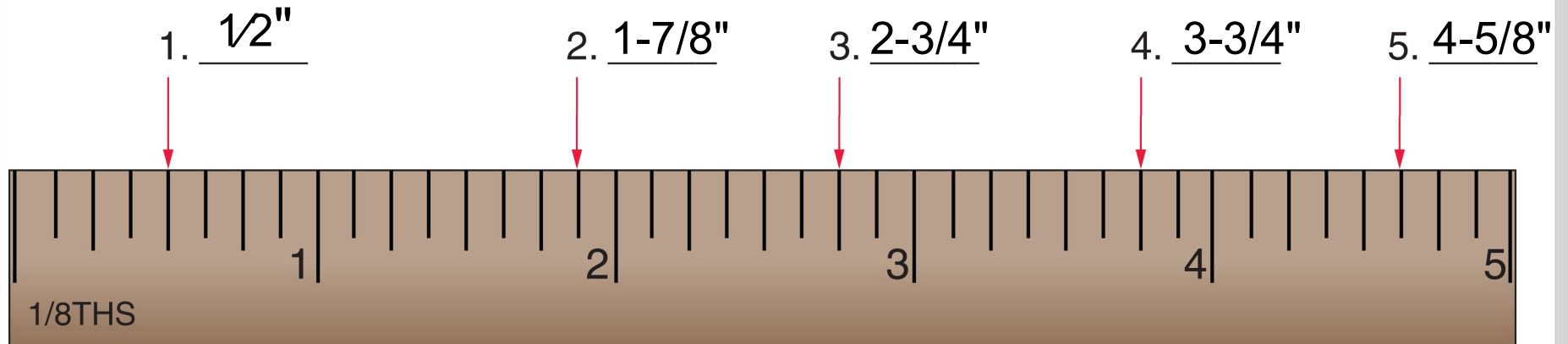
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Section 4.1.3 – Measuring

6. _5/8"_   7. _1-9/16"_   8. _2-5/16"_   9. _3-1/4"_   10. _4-7/16"_

1/16THS
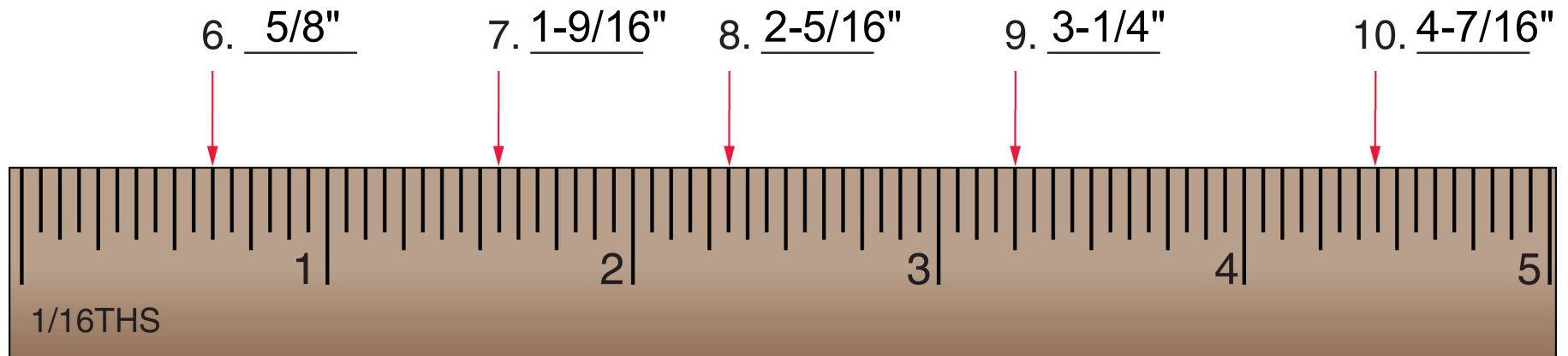
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Section 4.1.3 – Measuring

11. __0.1 cm__ 12. __1.1 cm__ 13. __1.9 cm__ 14. __29 mm__ 15. __38 mm__
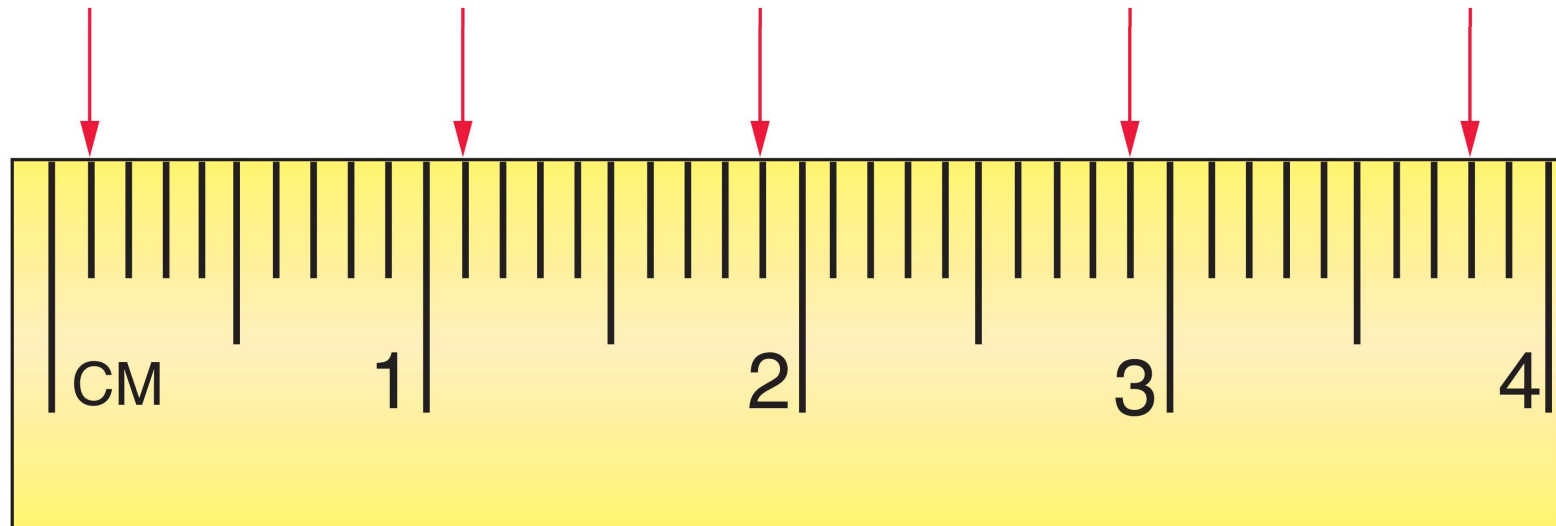
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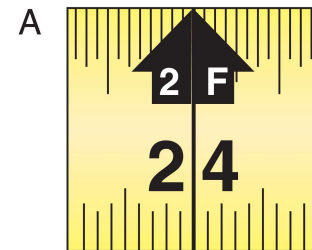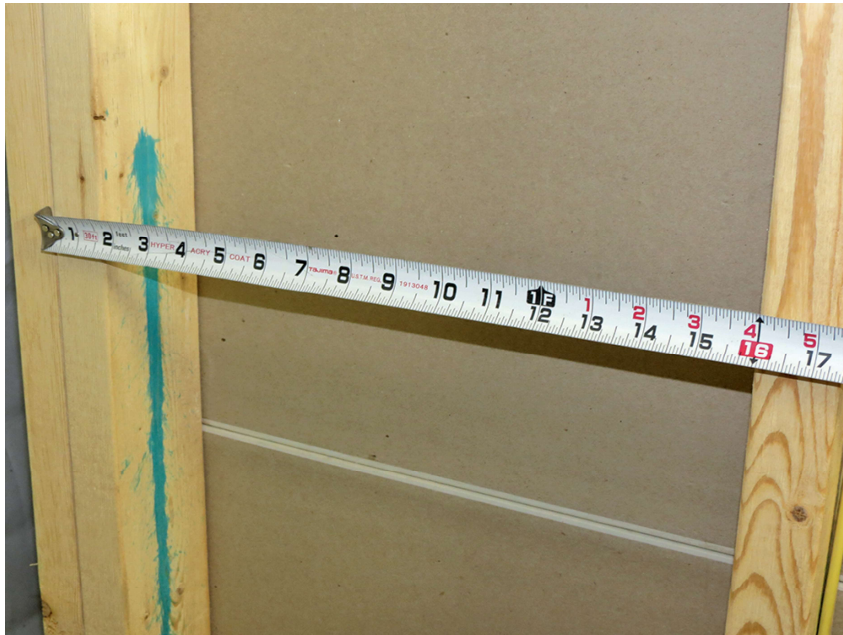
A Every 24 inches is marked with a contrasting black background. 24-inch spacing on center is used most commonly for nonbearing walls.
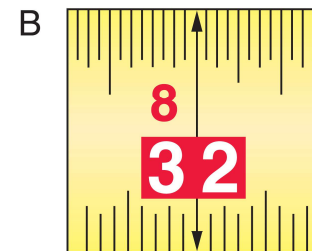
B Every 16 inches is marked with a red background. 16-inch spacing on center is used most commonly for loadbearing walls.
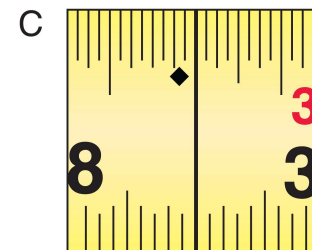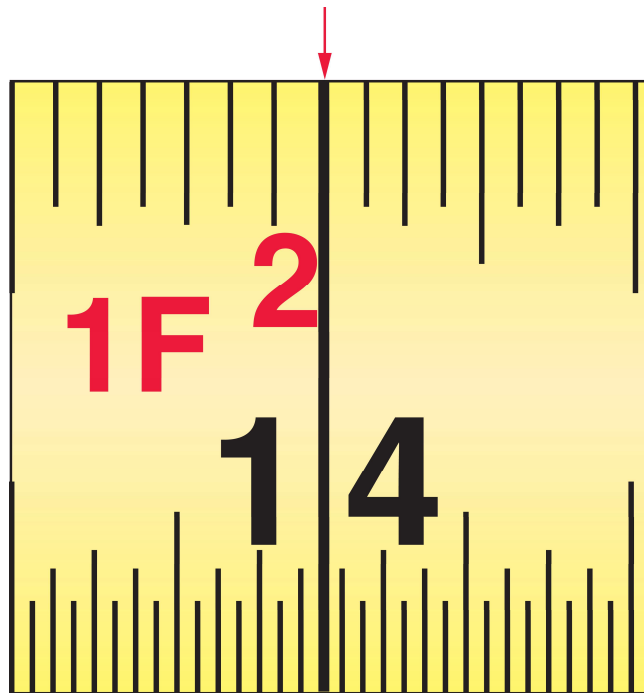
C Every 19.2 inches is marked with a small black diamond. 19.2-inch spacing on center is an alternate, less-commonly used spacing scheme for loadbearing walls.
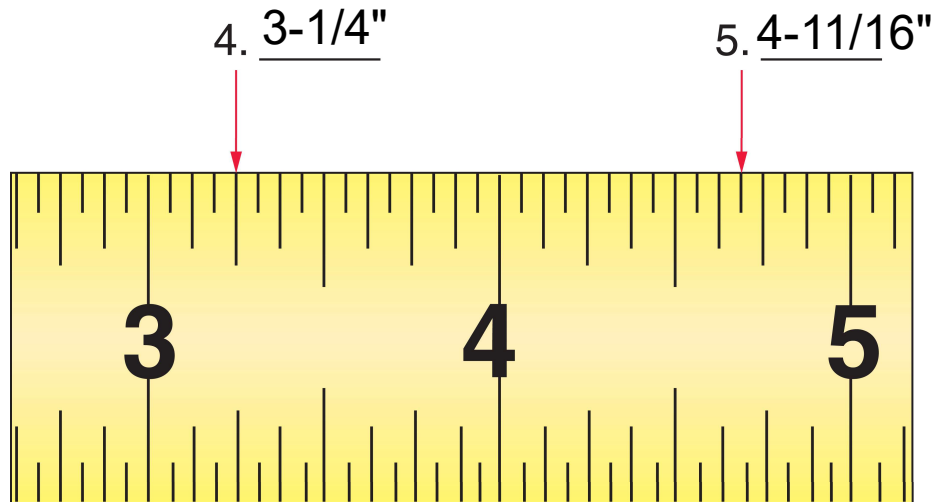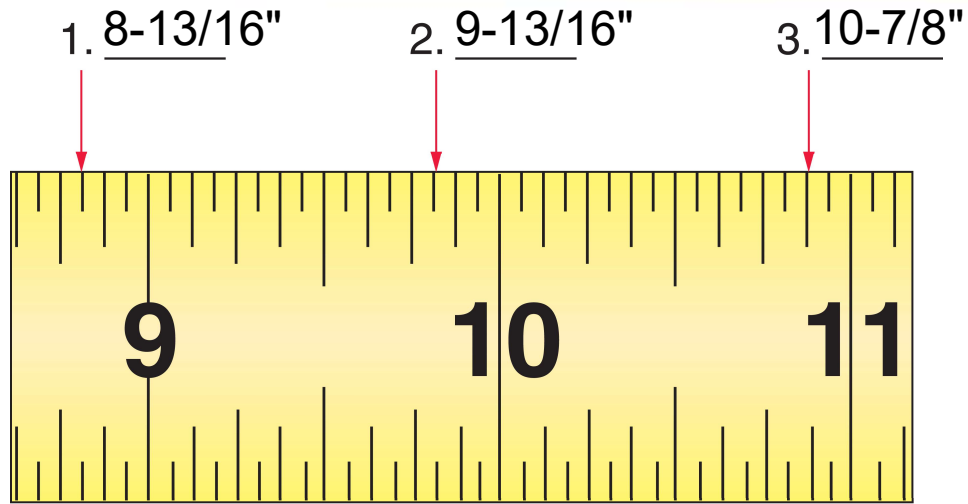
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The red and black number sets allow the user to consider the measurement as the total number of inches, or as feet and inches.
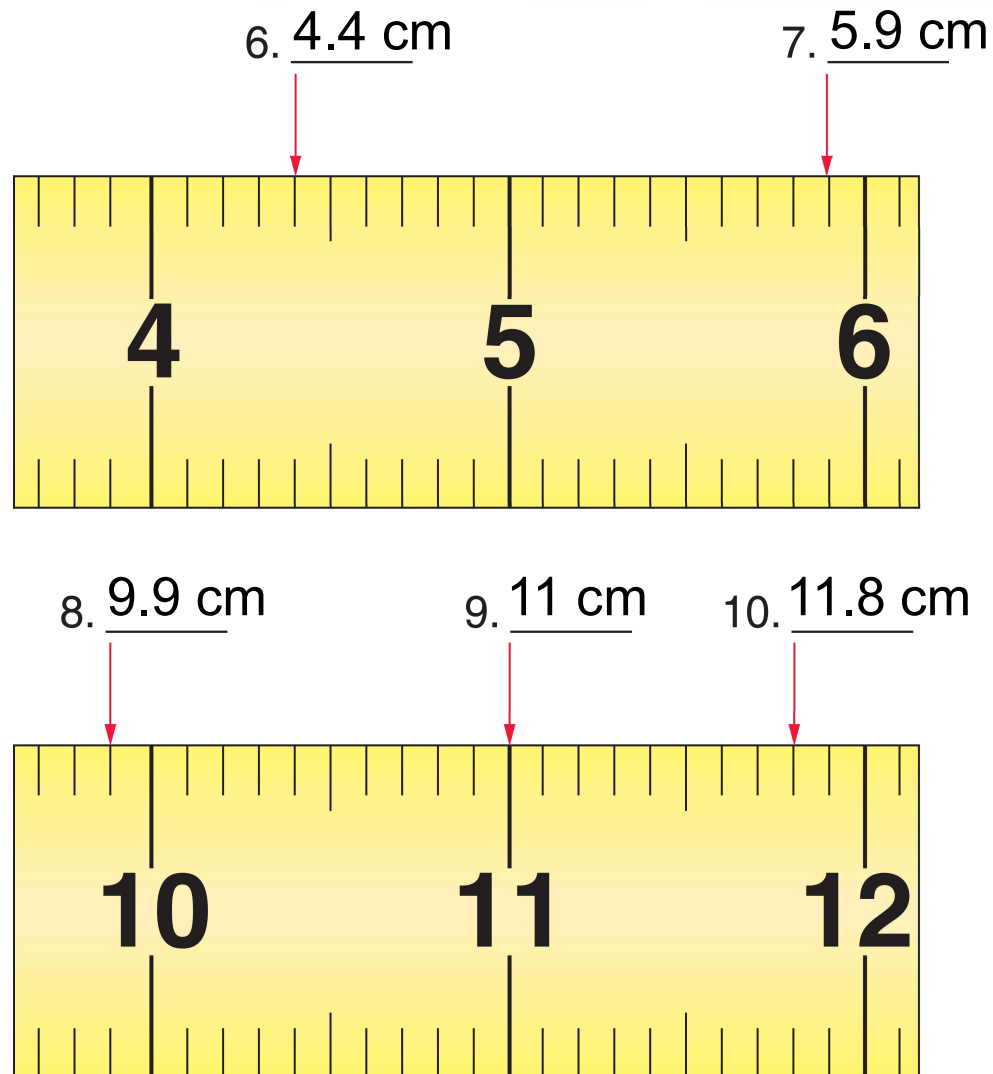

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Section 4.2.4 – Fractions

1. 8-13/16"   2. 9-13/16"   3. 10-7/8"

9   10   11

4. 3-1/4"   5. 4-11/16"

3   4   5

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6. <u>4.4</u> cm

7. <u>5.9</u> cm

8. <u>9.9</u> cm

9. <u>11</u> cm

10. <u>11.8</u> cm

Next Session…

UNITS OF MEASUREMENT; GEOMETRY

Read Sections 5.0.0 through 6.4.6.
Complete the Section Reviews
for Sections 5.0.0 and 6.0.0