Module 3: Understanding the Metric System

Let’s again complete a table to demonstrate the pattern. Fill in the blank cells. The abbreviations for the prefix on the word meter are shown in the parenthesis.

<table>
<thead>
<tr>
<th>Equivalent Lengths</th>
<th>kilometers (km)</th>
<th>hectometers (hm)</th>
<th>dekameters (dam)</th>
<th>meters (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 km</td>
<td></td>
<td>hm</td>
<td>dam</td>
<td>m</td>
</tr>
<tr>
<td>km</td>
<td></td>
<td>hm</td>
<td>86.5 dam</td>
<td>m</td>
</tr>
<tr>
<td>km</td>
<td></td>
<td>hm</td>
<td>dam</td>
<td>4,675 m</td>
</tr>
<tr>
<td>km</td>
<td></td>
<td>10.09 hm</td>
<td>dam</td>
<td>m</td>
</tr>
</tbody>
</table>

Again we can see that when moving across each row to the right, the numbers are multiplied by a factor of 10. When moving across each row to the left, the numbers are divided by a factor of 10. Remember that multiplying a number by 10 moves the decimal point to the right one place value. Dividing a number by 10 moves the decimal point to the left one place value.

Let’s now continue to develop our estimation skills by doing problems that require us to write in an appropriate metric unit.

Fill in the blank with the appropriate metric unit. Choose m, dam, hm, or km.

31) The length of a car is about 5 ____.
32) The height the Empire State Building is about 45 ____.
33) The radius of the earth is approximately 6,000 ____.
34) The distance from New York to Los Angeles is about 4,000 ____.
35) The height of the Statue of Liberty is about 1 ____.
36) The traveled length across the Golden Gate Bridge is about 2 ____.
37) A Boeing 747 Jumbo Jet is approximately 6.4 ____ in length.
38) The length of a NFL football field is approximately 9.1 ____ in length.
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The following diagram organizes the unit measures covered in this section in order from largest to smallest. Notice how the powers of ten are used to move from one unit measure to the next. Each arrow represents the movement of the decimal point one time. Use this diagram to answer the following questions.

Convert each measure to the indicated unit by moving the decimal point appropriately. Write down the number of times you moved the decimal point and the direction you moved it.

39) 3.8 hm to dm
40) 2,385 mm to hm
41) 0.7 cm to m
42) 0.91 dam to dm
43) 80.04 cm to hm
44) 31.08 m to hm
45) 19 hm to m
46) 31 dam to cm
47) 3,498 dm to km
48) 0.164 km to cm
49) 0.028 dam to dm
50) 1,578 mm to dm

Review Exercises

Evaluate the expression.
51) \( \frac{2}{3} - \frac{5}{6} + 8 \)
52) \(-3 + 8\left(\frac{3}{2}\right)^3 \div 9\)

Simplify the expression as much as possible.
53) \(-16 - 12x - 5 + 3x\)
54) \(8 - 5(2x - 3) + 6x\)
55) \(-2(-3 - 8) + 7\)
56) \(6 - |5 + 12| + 11\)

Fill in the blank with the appropriate metric unit.
57) The length of a paper clip is approximately 3.2 ____.
58) The diameter of a nickel is approximately 21 ____.

Answer True or False.
59) Dividing a number by 1,000 is the same as multiplying by \(\frac{1}{1,000}\).
60) 220 cm is 20 cm more than 2 dm.