DO NOT USE A CALCULATOR FOR QUESTIONS #1 to #4   OF THIS EXERCISE.
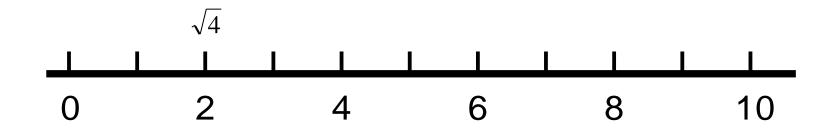
1. Place each of the radicals $\sqrt{4}, \sqrt{9}, \sqrt{16}, \sqrt{25}, \sqrt{36}, \sqrt{49}, \sqrt{64}, \sqrt{81}, \sqrt{100}$ on the number line below. **Notice that the first one is done for you.**

$$\sqrt{4}$$

| | | | | | | | | | |
| 0 | | 2 | | 4 | | 6 | | 8 | | 10 |

2. Also place $\sqrt{1}$ and $\sqrt{0}$ on the number line.

3. Now use the radicals already on the number line to help estimate the locations of $\sqrt{10}, \sqrt{47}, \sqrt{65}, \sqrt{72}, \sqrt{29}, \sqrt{3}$ and place each new radical on its estimated location on the number line.

4. Use the location on the number line to help estimate the value of each radical to one decimal place accuracy:

    $\sqrt{10} =$ $\sqrt{47} =$ $\sqrt{65} =$ $\sqrt{72} =$ $\sqrt{29} =$ $\sqrt{3} =$

5. Use a calculator to check your estimates of the values of the radicals in question #4.

6. Complete the list of perfect squares **(p)** and their square roots below:

p:	0	1	4	9	16	25	36	49	64	81	100									400
$\sqrt{p}$:	0	1	2																	

7. Estimate to one decimal place accuracy, then check with a calculator.

   a) $\sqrt{123} =$ b) $\sqrt{157} =$ c) $\sqrt{190} =$ d) $\sqrt{230} =$ e) $\sqrt{114} =$

8. Simplify each expression:

   a) $\sqrt{9} + \sqrt{16}$ b) $\sqrt{9+16}$ c) $\sqrt{60+\sqrt{16}}$ d) $\sqrt{\sqrt{25}+\sqrt{121}}$ e) $2\sqrt{169}$

   f) $25\sqrt{36} + 36\sqrt{25}$ g) $\sqrt{9} \times \sqrt{16}$ h) $\sqrt{9 \times 16}$ i) $\sqrt{2 \times 32}$ j) $\sqrt{95 - \sqrt{196}}$

   k) $\sqrt{169 - 144}$ l) $2\sqrt{100} - 10\sqrt{4}$ m) $\sqrt{5+\sqrt{6+\sqrt{99+1}}}$ n) $\sqrt{2\sqrt{225} - 3\sqrt{49}}$ o) $\dfrac{\sqrt{400} - \sqrt{16}}{\sqrt{100-36}}$

Answers:

8. a) 7   b) 5   c) 8   d) 4   e) 26   f) 330   g) 12   h) 12   i) 8   j) 9   k) 5   l) 0   m) 3   n) 3   o) 2