**Conversions Between Standard Form and Scientific Notation**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  
**Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Instructions**: Convert each number to the specified form. Show all your work for full credit.

**Part A: Convert from Standard Form to Scientific Notation**

1. Convert 45,000 to scientific notation.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Convert 0.00089 to scientific notation.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Convert 3,670,000 to scientific notation.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Convert 0.0000721 to scientific notation.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Convert 980,000,000 to scientific notation.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Part B: Convert from Scientific Notation to Standard Form**

1. Convert 2.3× 104 to standard form.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Convert 5.67×10−3  to standard form.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Convert 1.09×106 to standard form.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Convert 4.5×10−2 to standard form.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Convert 8.23×108 to standard form.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Part C: Mixed Problems**

1. Convert 7,250,000 to scientific notation.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Convert 6.45×10−5 to standard form.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Convert 0.00056 to scientific notation.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Convert 9.1×102 to standard form.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Convert 0.00321 to scientific notation.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Part D: Real-Life Applications**

1. The distance from the Earth to the Sun is approximately 93,000,000 miles. Express this distance in scientific notation.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. The mass of a hydrogen atom is approximately 1.67×10−2 grams. Express this mass in standard form.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. A computer processes data at a rate of 2.5×109 operations per second. Express this rate in standard form.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. A bacterium measures approximately 2.0×10−6 meters in length. Express this length in standard form.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. The population of a certain city is approximately 8,500,000. Express this population in scientific notation.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Part E: Challenge Problems**

1. Convert 0.000000345 to scientific notation.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Convert 7.89×107 to standard form.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Convert 123,000,000,000 to scientific notation.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Convert 1.234×10−4 to standard form.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. A light-year is approximately 5.88×1012 Express this distance in standard form.
   * **Answer**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Part A: Convert from Standard Form to Scientific Notation**

1. Convert 45,000 to scientific notation.
   * **Answer**: 4.5×104
2. Convert 0.00089 to scientific notation.
   * **Answer**: 8.9×10−4
3. Convert 3,670,000 to scientific notation.
   * **Answer**: 3.67×106
4. Convert 0.0000721 to scientific notation.
   * **Answer**: 7.21×10−5
5. Convert 980,000,000 to scientific notation.
   * **Answer**: 9.8×108

**Part B: Convert from Scientific Notation to Standard Form**

1. Convert 2.3×104 to standard form.
   * **Answer**: 23,000
2. Convert 5.67×10−3 to standard form.
   * **Answer**: 0.00567
3. Convert 1.09×106 to standard form.
   * **Answer**: 1,090,000
4. Convert 4.5×10−2 to standard form.
   * **Answer**: 0.045
5. Convert 8.23×108 to standard form.
   * **Answer**: 823,000,000

**Part C: Mixed Problems**

1. Convert 7,250,000 to scientific notation.
   * **Answer**: 7.25×106
2. Convert 6.45×10−5 to standard form.
   * **Answer**: 0.0000645
3. Convert 0.00056 to scientific notation.
   * **Answer**: 5.6×10−4
4. Convert 9.1×1029 to standard form.
   * **Answer**: 910
5. Convert 0.00321 to scientific notation.
   * **Answer**: 3.21×10−3

**Part D: Real-Life Applications**

1. The distance from the Earth to the Sun is approximately 93,000,000 miles. Express this distance in scientific notation.
   * **Answer**: 9.3×107 miles
2. The mass of a hydrogen atom is approximately 1.67×10−24 grams. Express this mass in standard form.
   * **Answer**: 0.00000000000000000000000167 grams
3. A computer processes data at a rate of 2.5×109 operations per second. Express this rate in standard form.
   * **Answer**: 2,500,000,000 operations per second
4. A bacterium measures approximately 2.0×10−6 meters in length. Express this length in standard form.
   * **Answer**: 0.000002 meters
5. The population of a certain city is approximately 8,500,000. Express this population in scientific notation.
   * **Answer**: 8.5×106

**Part E: Challenge Problems**

1. Convert 0.000000345 to scientific notation.
   * **Answer**: 3.45×10−7
2. Convert 7.89×107 to standard form.
   * **Answer**: 78,900,000
3. Convert 123,000,000,000 to scientific notation.
   * **Answer**: 1.23×1011
4. Convert 1.234×10−4 to standard form.
   * **Answer**: 0.0001234
5. A light-year is approximately 5.88×1012 miles. Express this distance in standard form.
   * **Answer**: 5,880,000,000,000 miles