Stat Support Activity: Scientific Notation

Notes

- Scientific Notation is a compact way for scientists to write very small numbers and very large numbers.
- Scientific notation is a number between 1 and $9.\overline{9}$ multiplied by a power of 10. If the number is very large, the exponent on the 10 will be positive. If the number is very small, the exponent on the 10 will be negative.
- Example: The distance from the earth to the sun is about 93 million miles (93,000,000 miles). In scientific notation this would be 9.3×10^7 miles.
- To convert a number in scientific notation with a positive power of 10, we would move the decimal to the right the same number of places as the exponent. In the previous example, we would move the decimal of 9.3 seven places to the right. We would have to add six zeros as place holders.
- Example: The atomic radius of gold is 0.146 nanometers or 0.000000000146 meters long. The scientific notation for this is 1.46×10^{-10} meter long.
- To convert a number in scientific notation with a negative power of 10, we would move the decimal to the left the same number of places as the exponent. In the previous example, we would move the decimal of 1.46 ten places to the left. We would have to add nine zeros as place holders.
- In Statistics, a P-value is a probability that can be very small and is often close to zero. Hence some computer programs write P-values in scientific notation.
- Example: Computer Program: P-value = 6.4×10^{-5}. To convert this P-value into a proportion, we will need to move the decimal in the 6.4 five places to the left. We will need to add four zeros as place holders. So the P-value = 6.4×10^{-5} = 0.000064 (Notice this is very close to zero.)

Problems

(#1-8) Directions: Convert the following Scientific Notations into the number they represent.

1. 3.1×10^7
2. 8.23×10^{-4}
3. 1.27×10^5
4. 2.94×10^{-8}
5. 5.7×10^6
6. 7.11×10^{-6}
7. 4.4×10^8
8. 6.08×10^{-7}

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(#9-16) Directions: The following statistics P-values were written in scientific notation. Convert the scientific notations into the proportion they represent by moving the decimal to the left the same number of places as the exponent. Then convert the proportion into a percentage by multiplying by 100 and adding the "%" symbol.

	Scientific Notation	Proportion	Percentage %
9.	8.1×10^{-3}		
10.	2.7×10^{-5}		
11.	1.63×10^{-1}		
12.	3.09×10^{-6}		
13.	4.2×10^{-2}		
14.	5.14×10^{-7}		
15.	6.78×10^{-4}		
16.	9.16×10^{-8}		