Density and Statistics Practice Sheet Answer Key

1. A block of wood has a mass of 12 g and a volume of 50 cm³. Calculate the density

Given	**object = block** **mass = 12 g** **volume = 50 cm³**	**Picture and Process**
Unknowns	**density**	*Draw picture, count, calculate*
Equation(s)	**density = mass/volume = 12 g / 50 cm³**	
Solution	**0.24 g/cm³**	

2. A block of metal has a mass of 23 g and a volume of 17 cm³. Calculate the density.

Given	**object = block, mass = 23 g, vol = 17 cm³**	**Picture and Process**
Unknowns	**density**	
Equation(s)	**density = mass/volume = 23 g / 17 cm³**	
Solution	**1.4 g/cm³**	

3. A cube of plastic has a mass of 17 g and a side length of 3 cm. Calculate the density.

Given	**object = cube, mass = 17 g, side length = 3 cm**	**Picture and Process**
Unknowns	**volume, density**	
Equation(s)	**volume = length³ = (3 cm)³ = 27 cm³** **density = mass/volume = 17 g / 27 cm³**	
Solution	**0.63 g/cm³**	

4. A cube of glass has a mass of 35 g and a side length of 7 cm. Calculate the density.

Given	**object = cube, mass = 35 g, side length = 7 cm**	**Picture and Process**
Unknowns	**volume, density**	
Equation(s)	**volume = length³ = (7 cm)³ = 343 cm³** **density = mass/volume = 35 g /343 cm³**	
Solution	**0.10 g/cm³**	

5. A rectangular prism has a mass of 80 g and a side lengths of 7 cm, 13 cm and 19 cm. Calculate the density.

Given	object = rectangular prism, mass = 80 g, side lengths = 7 cm, 13 cm, 19 cm	Picture and Process
Unknowns	volume, density	
Equation(s)	vol = l x w x h = 7 cm x 13 cm x 19 cm = 1,729 cm³ density = mass/volume = 80 g /1,729 cm³	
Solution	0.10 g/cm³	

6. A right triangular prism has a mass of 103 g, leg lengths of 4 cm and 9 cm, and a length of 17 cm. Calculate the density.

Given	object = right triangular prism, mass = 103 g, leg lengths of 4 cm and 9 cm, and a length of 17 cm	Picture and Process
Unknowns	volume, density vol = length x ½ (base x height) = 17 cm x ½ (4 cm x 9 cm) = 306 cm³	
Equation(s)	density = mass/volume = 103 g /306 cm³	
Solution	0.337 g/cm³	

7. Measurements of 0.43, 0.44, 0.42. 0.42, 0.43, 0.41, 0.41 cm are collected. Calculate the mean, median, mode and standard deviation for this data set.

Given	measurements of 0.43, 0.44, 0.42. 0.42, 0.43, 0.41, 0.41 cm
Unknowns	mean, median, mode, standard deviation
Equation(s)	**mean** = $\frac{\sum x_i}{n}$ = (0.43 cm + 0.44 cm + 0.42 cm + 0.42 cm + 0.43 cm + 0.41 cm + 0.41 cm) / 7 **median** = middle number of: 0.41, 0.41, 0.42, **0.42**, 0.43, 0.43, 0.44 **mode** = number that occurs that most, 0.41, 0.42, 0.43 all occur twice, the mean of these is 0.42 **standard deviation** = $\sqrt{(\frac{\sum(\bar{x}-x_i)}{n})}$ = $\sqrt{(\frac{(0.42-0.43)^2 + (0.42-0.44)^2 + (0.42-0.42)^2 + (0.42-0.42)^2 + (0.42-0.43)^2 + (0.42-0.41)^2 + (0.42-0.41)^2}{7})}$ = $\sqrt{\frac{0.0001+0.0004+0+0+0.0001+0.0001+0.0001)}{7}} = \sqrt{(\frac{0.0008}{7})}$
Solution	mean ≈ 0.42 cm median = 0.42 cm mode = 0.42 cm standard deviation ≈ 0.01

8. Measurements of 0.061, 0.019, 0.021. 0.022, 0.018, 0.018, 0.019 cm are collected. Calculate the mean, median, mode and standard deviation for this data set.

Given	measurements of 0.061, 0.019, 0.021, 0.022, 0.018, 0.018, 0.019 cm
Unknowns	mean, median, mode, standard deviation
Equation(s)	mean = $\frac{\sum x_i}{n}$ = (0.061 cm + 0.019 cm + 0.021 cm + 0.022 cm + 0.018 cm + 0.018 cm + 0.019 cm) / 7 median = middle number of: 0.018, 0.018, 0.019, <u>0.019</u>, 0.021, 0.022, 0.061 mode = number that occurs that most, 0.018 and 0.019 all occur twice, the mean of these is 0.0185, or ≈ 0.019 standard deviation = $\sqrt{\left(\frac{\sum(\bar{x}-x_i)}{n}\right)}$ = $\sqrt{\left(\frac{(0.025-0.061)^2 + (0.025-0.019)^2 + (0.025-0.021)^2 + (0.025-0.022)^2 + (0.025-0.018)^2 + (0.025-0.018)^2 + (0.025-0.019)^2}{7}\right)}$ $= \sqrt{\frac{0.001296+0+0.000036+0.000016+0.000009+0.000049+0.000049+0.000036)}{7}} = \sqrt{\left(\frac{0.001491}{7}\right)}$
Solution	mean ≈ 0.025 cm median = 0.019 cm mode = 0.019 cm standard deviation ≈ 0.015 cm