

Physical Science 303 – Homework 4 Rubric and Solutions

52 pts total

How many significant figures do each of these numbers have? **2 pts each**
The last two were not graded.

1. 5.82×10^{-2} sig figs: **3**
2. 2.3×10^{-5} sig figs: **2**
3. $0.582 + 5.2 = 5.8$ sig figs: **2**
4. $0.582 - 5.2 = -4.6$ sig figs: **2**
5. $0.582 \times 5.2 = 3.0$ sig figs: **2**
6. $0.582 \div 5.2 = 0.11$ sig figs: **2**
7. $\sin(2.80)$. When we write 2.80, we mean that the real value can range between 2.76 and 2.84. Let's see how this range changes when we calculate the sine of these values : $\sin(2.76) = 0.372$ and $\sin(2.84) = 0.297$. The first value would round to 0.4 while the second number would round to 0.3, so I'd say that we really only have one significant figure in this case.
8. $2.80^{1.6}$ When we write 2.80, we mean that the real value can range between 2.76 and 2.84. When we write 1.6, we mean that the real value can range between 1.55 and 1.64. Let's see how this range changes when we calculate the sine of these values : the biggest $2.84^{1.64} = 5.54$ and the smallest $2.76^{1.55} = 4.82$. The first value would round to 6 while the second number would round to 5, so I'd say that we really only have one significant figure in this case also.

Problem A: Choose two of the following four questions. Type up a short paragraph for each chosen question. Handwritten responses will not be read. I really suggest that you take some time and *think* about these issues before you choose. Then once you choose your two questions, I really encourage you to take more time to *think* about them. **20 pts possible for each response.**

- Find a physical situation associated with your major and draw the force diagram of one of the objects involved.
- Find an instance in the media or in your conversations that is a misunderstanding of a physical concept that we've covered in class. Then tell me the story.
- Write a question that you have about how something works. Apply the concepts in this class to that problem and see where it takes you.

- Identify and discuss an instance of doublethink that occurred for you in class. Doublethink appears in George Orwell's *1984* as, "The power of holding two contradictory beliefs in one's mind simultaneously, and accepting both of them." For example, it is when you convince yourself of something that you know is not true, and at the same time you are okay thinking it is true (even though you know it is not true).