

Tutorial Session Notes

Grade 8

Quarter #4 (Week 25-32)

About these notes:

- These notes are primarily for those who are acting as the tutor – either a parent or a class teacher.
- In the first year of JYMA, Maria (our JYMA tutor) and I met every week and talked about grades 5-8, and we made a list of suggested topics for the Friday tutorial session.
- In order to support those who are acting as the tutor for their child or a whole class, I am sharing these notes with those who are acting as the tutor.
- Of course, these tutorial sessions are also an opportunity for the students to ask their tutor questions.
- If you are acting as the tutor, it may be helpful to read the section of the JYMA Handbook titled “The Role of the Tutor”.

Week #25

- Ask how they did with group sheet #3 (p.45), have them share answers.
- Ask if there any questions from Sheet #5
- Density/Archimedes Principle practice
 - 50kg of aluminum weighs how much in water? (Hint: density of alum = 2.7 g/cm^3)
 - Solution:
Volume of the aluminum = $W/D = 18,519 \text{ cm}^3$, which also equals the volume of displaced water (b/c it sinks), therefore the displaced water is 18.519 ℓ and the weight of that water is therefore 18.519 kg because each liter of water weighs 1 kg.
The weight in water is $50 - 18.519 \text{ kg} = 31.481 \text{ kg}$.
 - How much does 3.8 ℓ of mercury weigh?
- Practice problems:
 - The cost of rope is \$0.89/ft. What is that price in Japanese yen/meter. (1 yen = \$0.0093)
 - If Jasmine eats \$39 worth of food in one month, how much money does it cost to feed her for 3 weeks.
 - The distance between New Orleans to Houston is 352 miles. On the map it measures $1 \frac{5}{8}$ inches. What is the verbal and the fractional scale of the map?

Week #26

- Ask them to share their thoughts about Group Worksheet #3 (p48).
- Go over practice test (which will be sent out in a separate email)
Please note: the practice test should not be done before the tutorial session.

Week #27

- PDA unit. See if there are any last second questions related to the last unit (PDA), because they have to take the test in the next couple of days.
- Algebra unit. Give them many different problems similar to Problem Set #3 and #4, except no laws of exponents. and no evaluate expressions.
- Go over brick lane puzzle from group work.

Week #28

- Ask if questions on **Algebra Practice Sheet #3 and #4** (p54-5)
- Do as many problems as possible from **Practice Sheet #6** together (p. 57)
- Go over bike ride puzzle (from the group assignment) if they wish (from puzzle book, #103)

Week #29

- Ask if they have any questions regarding **Algebra Sheet #5 and Sheet #6** (p56-7)
- Ask if they made any progress with the *Clock Hands* puzzle. Especially note that the answer has to be exact! (E.g., one of the answers is 1:05 and $27\frac{3}{11}$ seconds)
- *Card Trick*. This was done in the lecture. Ask if they tried to figure it out.
- *Important:* Review the idea of prime factorization. Find the prime factorization of:
16, 300, 72
- *Factors* puzzle: The five parts were:
 - a) Give at least one number that has *exactly* 6 factors.
 - b) Give at least one number that has *exactly* 10 factors.
 - c) Give at least one number that has *exactly* 9 factors.
 - d) Give at least one number that has *exactly* 7 factors.
 - e) Give at least one number that has *exactly* 13 factors.
 - Ask: How is it that a number can have an odd number of factors? (Ans: If it's a perfect square)
 - Guide them to discover the law behind this by completing this table:

Number	Prime Factorization	Number of Factors
8	2^3	4
27	3^3	
125	5^3	
16	2^4	
81	3^4	
32	2^5	
		7
		13

Week #30

- Ask if any questions from lecture.
- **Card Trick.** Ask if they understood the explanation for why the card in the card trick is in the 7th position?
- **Factors Problem**
 - Ask them if they know how many factors 65,000 has?
 - Fill in the factors table in Thursday's group assignment
 - What is the shortcut for looking at the prime factorization, and knowing how many factors the number has? (Answer: The product of one more than each of the exponents.)
 - Once they understand the above shortcut, see if they can determine the number of factors for:
 - 75
 - 800
 - 7056
- Try solving the **Two-Ant Problem:** (from puzzle book #201)
- If extra time, figure out the trick for multiplying a 2-digit number times nines.
Example: $62 \times 99,999$

Week #31

- Factors
 - How many factors does 350 have?
They should first work out the prime factorization, which is $2 \cdot 5^2 \cdot 7$. (Ans: $2 \cdot 3 \cdot 2 \rightarrow \underline{12}$)
 - How many factors does 432 have?
Answer: The prime factorization is $3^3 \cdot 2^4$. Ans: $4 \cdot 5 \rightarrow 20$
 - Give a number that has 5 factors.
(Ans: it must be a prime number to the 4th, such as 2^4 or 3^4 or 5^4 , etc.)
 - Give a number that has 11 factors.
(Ans: it must be a prime number to the 10th, such as 2^{10} or 3^{10} or 5^{10} , etc.)
- Ask them if they understood the solution for the Two-Ant problem.
- Ask if they got a solution for the Chinese remainder theorem.
 - Ans: 23, 128, 233...
- See if they found a trick for multiplying 2-digit number by nines (problem 238c in the puzzle book)
- Help them with any of the **Year-End Review** practice problems (p58-59).

Week #32

- Do something fun! Bring the year to a nice close!