Algebra Problems **Group work : Oral presentations + written report**	DNL 1ère 2013-14

Topics: Algbra and Prealgebra
No knowledge beyond "Seconde" is required

■ <u>Directions</u>

Work in groups of **three or four** students, preferably from the same class as it will be easier to meet to finish the project. One of the problems below will be assigned to your group. You will have to **presen**t the problem and its solution to the class and also to turn in a **written report** about your findings. Make sure you split the oral presentation (so each member of your group gets a chance to talk) and the writing of the report (everyone's handwriting should appear in the written report)[1].

■ <u>Oral presentation</u> : On Tuesday October 8th.

• <u>Describe the problem to the class</u>. If you wish, while a person talks, another member of the team can draw a diagram on the board to explain the situation or the strategy. You can also bring a poster you made in advance and hang it or you can prepare a *PowerPoint* presentation. DO NOT READ the problem: Explain it with you own words.

• Explain which difficulties you ran into while working on the problem. Explain your strategy. If you had several ideas, explain why you picked this one. Explain the steps you took, focusing on the ideas rather than on the computations. The details of the computations should go in the written report.

• Be ready to answer questions from your classmates at the end of your presentation (which in turn implies that you should also be ready to ask questions about the work of the other teams!)

Before the presentation takes place

• Decide who will present what. Do not forget that describing the problem to the audience is a large share of your presentation. What's the point of presenting to the solution if they didn't understand the problem?

• Remember that the whole group is responsible for the content of what any team member says (*see Grading Rubric*): Make sure every one in the group understands the details and can explain them!

• If you have any doubts about how to pronounce some words, type them into http://dictionary.reference.com/ and then click on the microphone icon to listen to them.

• You may rehearse you presentation in front of other group members so they can help you improve it. If you have a mp3 player which can record sounds or, even better, a phone which can record videos, you may use it.

■ <u>Written report</u> : due on Tuesday October 15th.

• Explain your strategy and the steps you took.

• Show your work: Give a detailed account of the computations you've made.

• *Stretch it (extra credit question)*: If you have some time left, take the problem one step further: Your problem may naturally lead to another question (getting a more precise answer, or stating and proving a generalization of your result). State the question an answer it.

■ <u>How your work will be assessed</u>: : See the rubric on page 3, "Teacher's worksheet"

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[1] *If you do not talk during the oral presentation, you will be assigned a grade of 0 for this part of the project. Similarly, if you handwriting does not appear in the written report, you will be assigned a grade of 0 for this part of the project.*

○ Problem 1. Dress Dye Dilemma /daɪ/ /dɪˈlɛmə/ [ES only]

Okay, so your favorite white dress got a stain that won't fully come out. Bummer. But you've decided to make the best out of the situation : You're going to hide the stain by dying the entire dress an antique yellow - beautiful! (Antique yellow can be made from diluting brown dye.) You have 8 cups of a brown dye solution that is 30% brown dye, but you read on-line that 5% is best for that antique look. Otherwise the dress might come out sort of tan.
How many cups of water should you add to your existing dye solution to get the perfect dye color for your dress?

○ Problem 2. Mermaids at home /ˈmɜrˌmeɪd/ ! [ES only]

Your adorable little sister was playing with her mermaid dolls last night. She filled the bathtub with water and then added salt to make 40 gallons of salt water; in fact, it is 4% salt, almost like the ocean! Later she forgot to drain the tube. Now, the next morning, it is 5% salt. How much water must have evaporated?

○ Problem 3. Run around the track

Kelly and the school's track star, Aurelia, start running around the quarter-mile track at the same time. Aurelia runs 2 miles per hour faster than Kelly. How long will it be until Aurelia laps Kelly?
[What does it mean to "lap"someone? It means that Aurelia passes Kelly somewhere on the track, so at this moment Aurelia has run exactly one lap more than Kelly has.]

○ Problem 4. Walk and jogg

So today Maïalen decided to walk from her house to the park at a nice steady pace of 3 miles per hour. On the way back, her mp3 player played a much faster song and she jogged the whole way back! In fact, she jogged 2 miles per hour faster than she walked. If the entire trip took her a total of 2 hours, how far was the park from Maïalen's house?

○ Problem 5. Money [ES/S]

Raphaelle has 5 more times dimes than quarters, half as many nickels as quarters, and no pennies. If she has a total of $6.20, how many dimes does she have?
[In your presentation, do not forget to explain what dime, quarters, and nickels are. Most of your classmates probably don't know.]

○ Problem 6. Helping with chores around the houses /tʃɔr/

To earn his allowance, Rayan does chores around the house. He makes $2.00 for each chore he does and gets $1.50 deducted for each chore he forgets to do. There is a total of 13 possible chores each week. This week he made $19. How many chores did he forget to do?

○ Problem 7. Pool party [Slightly harder than the others? S?]

You're throwing a pool party today, and all your friends are coming. It's going to be a blast! What your parents didn't tell you was … that has to be drained this morning. Um hello, that would have been good information but whatever.
The engineer just started refilling the pool using two pipes but will your pool be filled in time? I mean, people start arriving in two and a half hours and you haven't made the hors d'oeuvre yet. Okay, deep breath. this is when the engineer tells you: "The smaller pipe by itself can fill the pool in 5 hours. The bigger pipe works twice as fast, and we've got both working together."Just then, she got a phone call. Can you figure out how long it is going to take to fill the pool? Will it be filled on time?

If you are done with your problem, try one of the following ones: Challenge problems

○ Problem 8. Factorial /fækˈtɔriəl/ [S]

2! (read "2 factorial") is defined by $2!=2\times1$, $3!=1\times2\times1$, $4!=4\times3\times2\times1$ …etc.

1) Determine the last two digits of 17!

2) How many times does last digit of 627! repeat at the end of this number?

○ Problem 9. Coiled wire [ES / S]

Let's consider a problem of a type often encountered by plumbers, electricians and engineers: measuring or wrapping a wire around a cylindrical pipe. Suppose that eight turns of a wire are wrapped around a pipe with length of 20 centimeters and a circumference of 6 centimeters. What is the length of the wire?
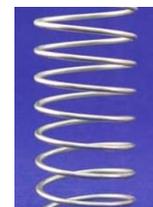
Problem solving : You've got Problems!

Group work : Oral presentations + written report

■ **GROUP WORK: How work will be assessed:**	Sdt	Sdt	Sdt	Sdt		
					Team	
In class group work:						
Used English only while working on the project in class.					X	1,5
Worked cooperatively with other team members: listened to other team members, offered ideas. Made constructive rather than negative comments on the work of other team members.					X	1
Worked quietly so as not to disturb the other teams (please whisper!)					X	1
Subtotal						**3,5**
Oral presentation (each member of the team should talk in turn):						
The problem was explained clearly.	X	X	X	X		2
The strategy (and why you chose it) was explained clearly.	X	X	X	X		1,5
The steps taken were explained clearly.	X	X	X	X		1,5
Eye contact. Voice loud and clear						1,5
English didn't get in the way. The reporter was talking rather than reading his/her notes.					X	5
Subtotal						**11,5**
Written report (each member of the team should write a part of it):						
The solution is correct in terms of mathematics and logic. The presentation is well organized and provides the necessary details	X	X	X	X		3
The English is correct.	X	X	X	X		1,5
Bonus: Stretch it.	X	X	X	X		*2*
Subtotal						**4,5**
Class sharing						
Listened carefully to the others teams' presentations.					X	1
Bonus: Offered good comments, asked relevant questions during the others teams' presentations.					X	1
Subtotal						**1**
GRADE					X	**/20**