

Emmy Noether – Circle 2 for 2004-2005



Part I: Problems

Problem 1:

Mackenzie has to be at school by 9:00 a.m., but is usually 10 minutes late. It takes her 15 minutes to get dressed, 20 minutes to eat, and 35 minutes to walk to school. What time should she get up in order to be at school on time? What time does she usually get up?



Problem 2:

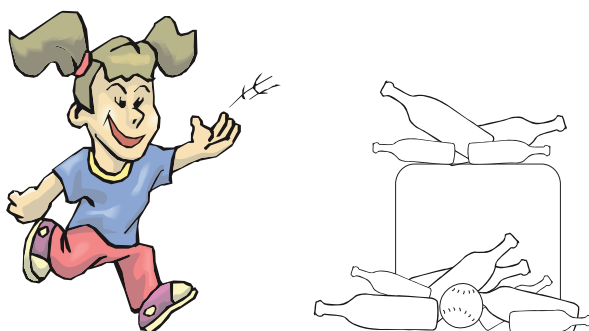
a) Wei wants an allowance. His father offers him the choice of either a weekly allowance of \$10.00, paid on Sunday, or a daily allowance paid as follows: on Monday, he gets \$0.05; on Tuesday, \$0.10, on Wednesday, \$0.20; and so on doubling each day through Sunday. Which choice will get Wei more money?

b) Suppose Wei's father offers, instead, \$50.00 every two weeks, or a daily allowance as in part a), but with continued doubling for 14 days. Which choice will get Wei more money?



Problem 3:

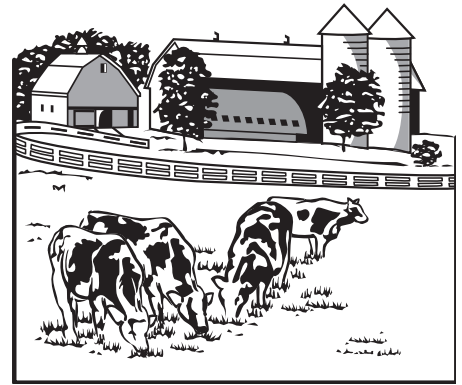
Genevieve wants to win a large stuffed rabbit playing a game at the fair. She knocks over 12 bottles, some small and some large, for a total of 220 points. Each small bottle is worth 25 points and each large bottle is worth 15 points. If she must hit 5 small and 6 large bottles to win, did she win the rabbit? Why or why not?



Problem 4:

Farmer Brown's 4 cows require 100 square metres of pasture. He wants to fence a field for them.

- a) How many different rectangular fields with sides being whole numbers would meet these requirements? Are all of these choices sensible? Explain.
- b) If fencing costs \$10 per metre, which of these fields would be least expensive to fence? What is the shape of this field?

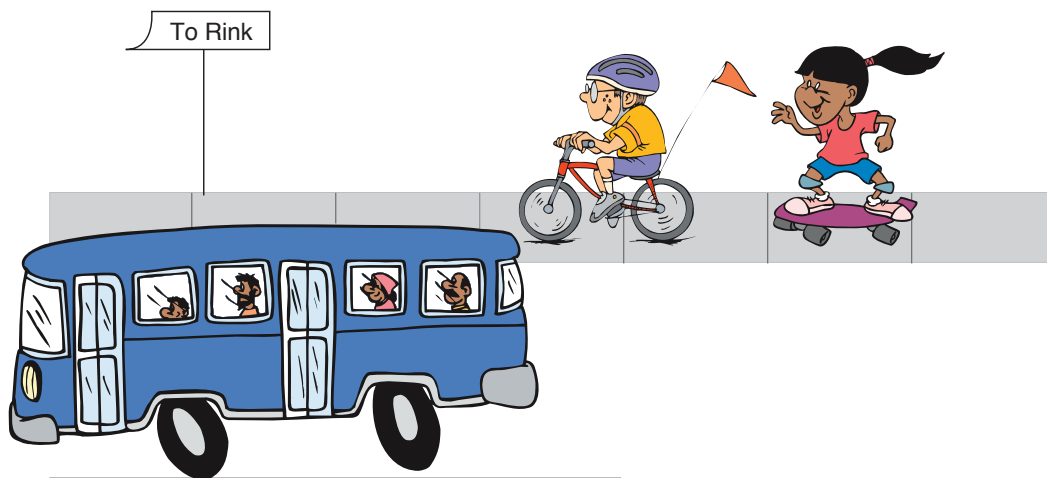


Extension:

Repeat parts a) and b) if Farmer Brown has 8 cows requiring 200 square metres of pasture. Is the shape of the least expensive field the same shape as in b)? Why or why not?

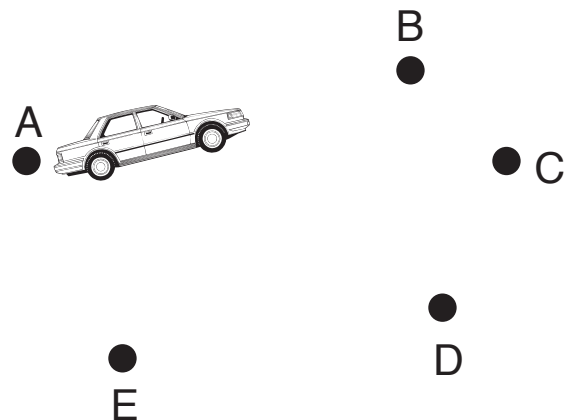
Problem 5:

Ali, Juan, and Indira like to go skating on Saturdays. Ali gets to the rink by bike, and takes twice as long to get there as Indira, who goes by skateboard. Juan goes by bus, taking 10 minutes more than the sum of Ali's and Indira's travel times. If the sum of all three skaters' times is 64 minutes, how many minutes did each skater take to travel to the rink?



Problem 6: (Suggested as a group problem)

- a) The province has decided to build roads joining each of the towns A, B, C, D, E to every other one. How many roads will there be?
- b) A travelling saleswoman always starts from her hometown, A, and drives to visit customers in towns B, C, D, and E, going to each of these four towns once and only once, but not necessarily in that order. If she can change roads only at towns, and not in between, how many different routes can she take?



Extension:

Suppose a bridge is washed out on the road between towns B and E. What change does this make to your answer in b)?