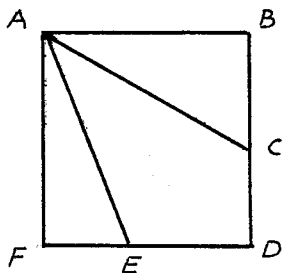


UBC Grade 8–9 Workshop Problems 2003

1. Laura wants to get an A (at least 86% average) in her math class. If she has scored 80%, 78%, 97% and 76% on the past four exams, and has one more exam that counts the same as the previous ones, can she get an A in math? If so, what percentage does she need on the last exam to get the A ?
2. The Fuzzy Feelings Cola Company is promoting a new product. Its original product, Fuzzola Cola, came in a 500 mL can containing 75% Real Fuzz and cost \$1.00. The new product is a 700 mL bottle of Fuzzola Cola costing \$1.40, advertised with “5% more Real Fuzz than before.” What percentage of the new product is Real Fuzz?
3. David has a supply of solid cubes, each $3\text{ cm} \times 3\text{ cm} \times 3\text{ cm}$. How many of these solid cubes can David fit into an empty box that is in the shape of a cube with edge length 12 cm? How many if David fills a different empty box still in the shape of a cube but with edge length twice as long? three times as long? n times as long (where n is an arbitrary positive integer)?
4. The Jassway grocery store sold 70% of its Hallowe'en pumpkins, and on Hallowe'en it gave 80% of its unsold pumpkins to a charity and discarded the rest. If the charity got 240 pumpkins, how many were discarded and how many pumpkins did Jassway originally have?
5. Mike has \$111.00 and goes to the store to buy some fruits. He wants equal numbers of pineapples, mangos and watermelons. The pineapples cost \$3.00 each, the mangos cost \$1.55 each, and the watermelons are \$2.75 each. How many fruits can Mike afford?
6. Two teams race each other across a river that is 30 m wide. Team one paddles a canoe across the river and the current takes the canoe downstream exactly to the finish point on the other side of the river, a distance of 50 m in a straight line from the starting point. Team two paddles their canoe faster from the same starting point, and reaches the other side of the river 10 m downstream from the point directly across the river from the starting point. The team members then run the rest of the way along the river bank to the finish point. Which team travels farther, and by how much?
7. How long is the longest thin straight rod that can fit inside a closed rectangular box that has dimensions $30\text{ cm} \times 40\text{ cm} \times 120\text{ cm}$?
8. Ed and Fred race their bicycles against each other, but Ed travels slower than Fred. Ed rides his mountain bike at 25 km/h and Fred rides his road bike at 32 km/h. The race is 50 km, and Ed gets a half hour head start. Who wins?
9. If $ABDF$ is a square with perimeter 56 cm, the length of BC is 8 cm and the length of EF is 6 cm, what is the area of the quadrilateral $ACDE$?



10. Eric is driving a truck along a road. The truck has a rectangular cross-section 7 m high and 4 m wide. Along the way the road enters a semicircular tunnel divided down the middle by thin steel pillars. If the width of the tunnel at the road level is 16 m, will Eric's truck fit through?
11. Mark has a string of Christmas lights with five empty sockets in a row, and a package of five new bulbs coloured red, green, blue, orange and yellow. Because it is Christmas, Mark wants the red bulb to always be next to the green bulb. If he follows this rule, how many different ways can Mark put all the new bulbs in all the empty sockets?
12. Professor Warner has discovered a new animal called a glibble. Each glibble lives for two days. One day after it is born, it gives birth to a new glibble, and the next day it gives birth to one more new glibble and dies. If the professor starts with one newborn glibble on the first day, how many live glibbles would he have on the fifteenth day?
13. Oi-Lam phoned her friend whose seven-digit phone number contains two 1's, two 2's, two 3's and a 9, but not necessarily in that order. But when Oi-Lam dialled the number, she instead got the Emergency Number 9-1-1. Later she found out that this was because one of the number keys on her phone didn't work. How many possible phone numbers could her friend have? Dialling a number whose first three digits are 911 (like 911 2233) would connect to the Emergency Number.
14. Erfan visits his friend and then returns home by the same route. He always walks 3 km/h when on level ground, 2 km/h when walking uphill, and 6 km/h when walking downhill. If his walking time for the round trip is 6 hours, how far does he walk?
15. A car is travelling at 30 m/s along a road, and a limousine is travelling at 24 m/s in the opposite direction. If the car is 3 m long and it takes $\frac{1}{6}$ s for the car and the limousine to completely pass by each other, how long is the limousine?
16. What is the last digit of 3^{2003} ? Can you prove your answer?
17. Keenan plays a game in which he can win as much as \$3000. To play, he first chooses at random one of three cards numbered 1, 2 and 3. The number on the chosen card determines how many chips Keenan may draw at random from a bag. The bag contains five chips, three of which are green and two of which are red. A green chip is worth \$1000, a red chip is worth nothing, and each time a chip is drawn it is not replaced. What are Keenan's chances of winning at least \$2000?
18. How many in the set of numbers $\left\{ \frac{1}{10000}, \frac{2}{10000}, \frac{3}{10000}, \dots, \frac{9999}{10000}, \frac{10000}{10000} \right\}$ are fractions reduced to lowest terms?