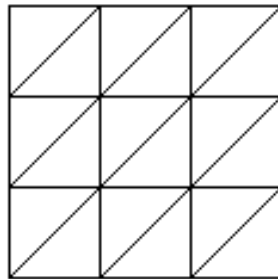


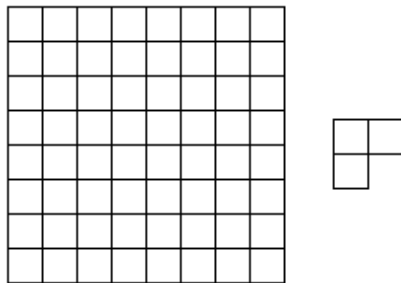
UBC Grade 8/9 Problems 2000

1. Fresh mushrooms are 90% water. Dried mushrooms are only 12% water.
 - (a) How many kilograms of fresh mushrooms do we need in order to make 10 kg of dried mushrooms?
 - (b) How many kilograms of dried mushrooms do we get from 11 kg of fresh?
2. How many triangles, of various sizes, are there in the picture to the right? What about if we have a 4×4 board instead of a 3×3 board?

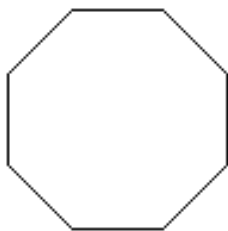


3. When a lion dines alone, she eats a lamb in 2 hours. A wolf, all by herself, eats a lamb in 3 hours. And a fox can eat a lamb in 6 hours. If they have supper together, how long will it take them to eat 3 lambs? How much lamb does each one of them get?
4. Three circular gold disks have diameter 6 cm, 6 cm, and 7 cm. Each disk is 1 mm thick. The disks are melted down to make a single 1 mm thick circular disk. Find the diameter of this disk.

5. (a) The chessboard has sixty-four 1×1 squares. The *tromino* has three 1×1 squares. In how many ways can we place the tromino on the chessboard so that it covers three squares of the board exactly?
(b) What about if the board has m rows and n columns?

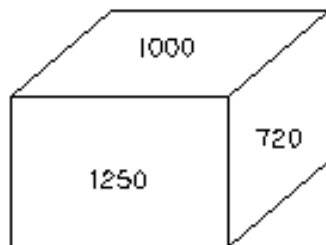


6. A box contains fewer than 220 loonies. When they are grouped in groups of 4, three loonies are left over. When they are grouped in groups of 5, again three are left over. And when they are grouped in groups of 11, none are left over. How many loonies are in the box?
7. It takes 75 seconds to pump 20 dollars' worth of gas into a car. After 60 additional seconds, the amount pumped reaches 20 gallons. Find the price of a gallon of gas.
8. A *regular octagon* is an eight-sided polygon with all sides equal and all angles equal. Find, correct to three decimal places, the area of a regular octagon all of whose sides have length 1.

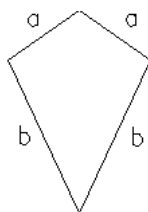


9. Anna runs around an oval track, taking 72 seconds per lap. Boris runs around the track in the opposite direction. Anna and Boris pass each other every 40 seconds. How long does Boris take per lap?

10. A cardboard box of the usual shape has sides of area 720 cm^2 , 1000 cm^2 , and 1250 cm^2 . Find the volume of the box.



11. An 8 inch by 8 inch cake is 3 inches high, and is frosted as usual on the top and sides. Divide the cake into 5 pieces so that every piece has the same amount of cake and the same amount of frosting.
12. You have two thin sticks of length a and two of length b , and want to make a kite-shaped figure that encloses the largest possible area. What is that maximum area?



13. (a) How many ways are there to give change for a ten dollar bill using nothing other than two-dollar coins, one-dollar coins, and quarters?
(b) How many ways are there to give change for a twenty dollar bill?
A fifty dollar bill?
14. Sara got three-quarters of the way up the Grouse Grind in 42 minutes and 36 seconds. She did the fourth quarter in a minute and 30 seconds less than the third quarter. The second half took exactly as long as the first half. How long did the entire hike take?

15. A paper drinking cup has the shape of a cone. When there is water in the cup to a depth of 4 cm, there are 16 cubic cm of water in the cup. How much water is in the cup when the water is 6 cm deep?



16. Alicia started going up the Grouse Grind at 4:30. Fred and Janet started 30 minutes later. Janet passed Alicia at the halfway point, and Fred passed Alicia 16 minutes after Janet did. Janet got to the top 12 minutes before Fred. At what time did Alicia reach the top? (Assume that everyone climbs at unvarying speed.)
17. Find the sum of all the three-digit numbers all of whose digits are odd.