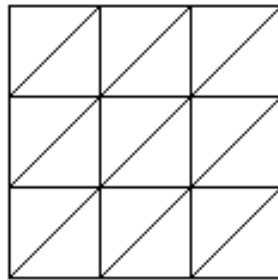


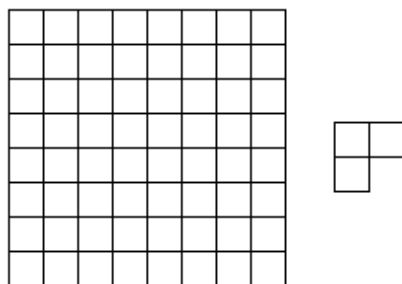
UBC Grade 7 Problems 2000

1. Rent-a-Wreck will rent you a car for \$16.95 a day plus 15 cents a mile. Lease-a-Loser charges \$19.95 a day plus 10 cents a mile. At how many miles per day does Lease-a-Loser become the better deal?
2. How many triangles, of various sizes, are in the picture?



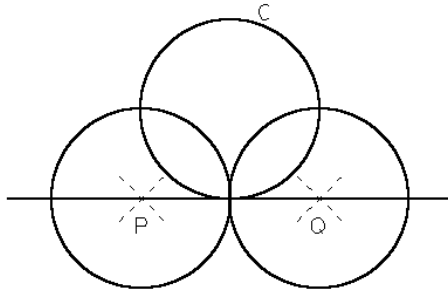
3. At every store that Alphonse went into, he spent half the money in his pocket plus a dollar. After shopping in four stores he had only \$1.50 left, so he went home. How much money did he start out with?
4. Fresh mushrooms are 90% water. Dried mushrooms are only 12% water.
 - (a) How many kilograms 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?
5. Sophie lies on Wednesdays, Thursdays, and Saturdays, and tells the truth the rest of the time. Mary lies Mondays, Thursdays, and Fridays. Today they both said: "Yesterday I lied." What day is it today?
6. 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?

7. 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 as to cover three squares of the board exactly?



8. In a quiz show, every contestant is asked exactly 10 questions. The correct answer to the first question is worth \$2. The second question is worth \$4, the third \$8, the fourth \$16, and so on. Someone won \$650. How many questions did she get right? Which ones?
9. A digital clock shows only the hours and minutes. For what fraction of the time does the display show at least one “1”? Assume that transitions, such as from showing 12:25 to showing 12:26, are instantaneous.
10. Each pizza the Math Club ordered has *three* different toppings chosen from bacon, ham, mushroom, onion, and red pepper. There is bacon on 12 pizzas and ham on 27. No pizza has both bacon and ham—that would be too piggy. There is mushroom on 28 pizzas, onion on 29, and red pepper on 30. How many vegetarian pizzas are there?
11. 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?

12. Two circles of radius 1 cm have centers P and Q which are 2 cm apart. A third circle $\mathcal{C}$, also of radius 1, is tangent to the line PQ . Find the area of the region which is inside $\mathcal{C}$ but outside the other two circles.



13. The *Fibonacci sequence* 1, 1, 2, 3, 5, 8, 13, 21, 34, ... obeys the rule that the next number is always the sum of the previous two. Find the remainder when the 39-th element of the Fibonacci sequence is divided by 4.
14. 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?
15. 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?
16. (a) How many positive integers divide 210 exactly? For example 1, 35, and 210 do.
(b) How many divide 420? How many divide 840?
17. 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.)