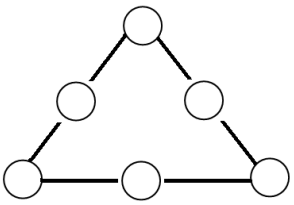
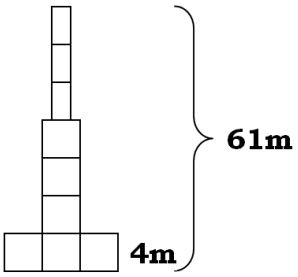
SHORT ANSWER PROBLEMS

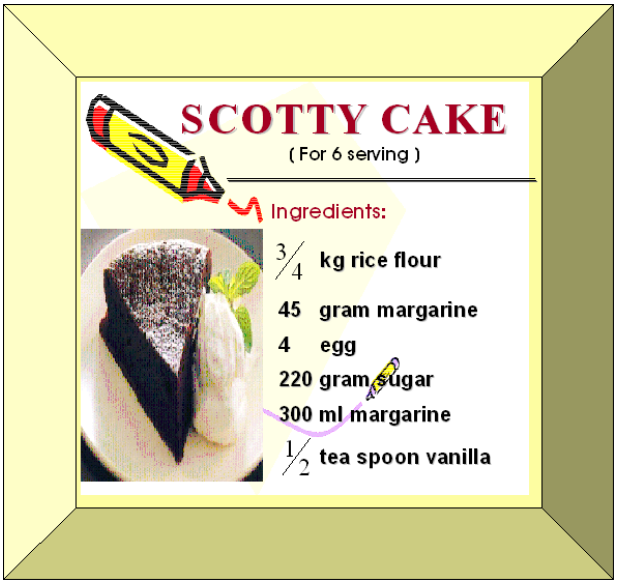
1. Complete this magic triangle so that the numbers along each side give the same sum. Use each of the numbers 5, 6, 7, 8, 9 and 10 only once. (You are required to give only one solution.)



2. The height of the ground floor of a building is 4 m. The height of each of the other floors is 3 m. The total height of this building is 61 m. Inclusive of the ground floor, how many floors does the building have?



3. The composition of Scotty Cake for 6 servings is shown below.
   How much rice flour is needed to make Scotty cake for 10 servings?



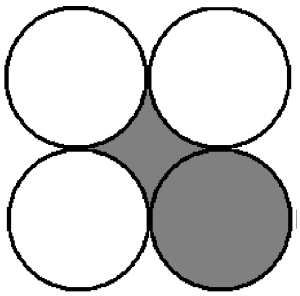
4. If a positive whole number B is divided by 2, 3, 4, 6 or 9, the remainder is 1. Find the smallest possible value of B.

5. During the first five months of 2004, a company suffered a loss, then gained profit in the remaining seven months. The biggest loss, occurred in March, was 10 million rupiahs. The lowest profit was 9 million rupiahs in June and the highest profit was 15 million rupiahs in October. At least how much was the company's profit during the whole year of 2004?

6. The average score of a mathematics test in a class of 48 students was 80. Changes were made to the scores of two students. One score was changed from 86 to 93. The other score was changed from 85 to 84. What is the new average score of the test?

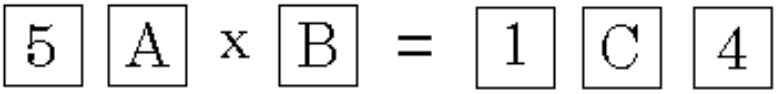
7. Ms. Olmer pays the employees of her company every first Wednesday of the month. She goes to the bank to get the money for the salaries every first Tuesday of the month. One Wednesday morning, Ms. Olmer realized that she had to pay the employees, but she had not yet gone to the bank to get the money. What day is the fifth day of that month?

8. The figure below shows four equal circles. Each circle touches two adjacent circles. If the radius of each circle is 10 cm, find the area of the shaded region.



9. Mr. White multiplies the first one hundred prime numbers. How many consecutive zero digits can be found at the end of the resulting number?

10. A, B and C are nonnegative whole numbers less than 10 and satisfying the following multiplication: Find one set of values for A, B and C.



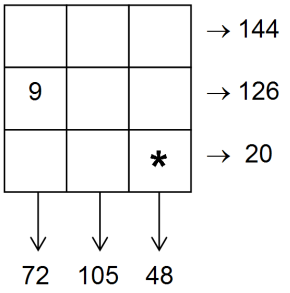
11. Andy multiplies the first fifty whole numbers: $1 \times 2 \times 3 \times 4 \times \cdots \times 50$. Counting from the right, what is the position of the first non-zero digit? For example, in 205000, the position of the first non-zero digit from the right is 4.

12. A circular bicycle path is 1 km long. Dodi rode a bicycle for two rounds at the speed of 30 kph. If he wants to average 40 kph, what should be his speed for the next four rounds?

13. Each letter represents a non-zero whole number less than 10. Different letters represent different numbers. Find the four-digit number $STNA$.

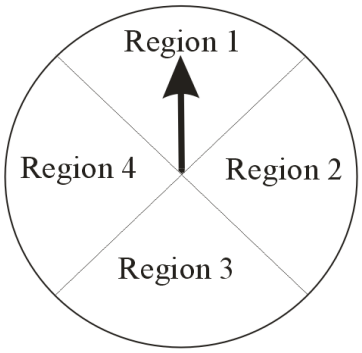
4	x	A	N	T	S	=	S	T	N	A

14. The entries to the table below are whole numbers $1, 2, 3, \ldots, 9$. Each number appears only once in the table. The numbers written to the right and below the table are products of numbers in the respective rows and columns. Find the number represented by "*".

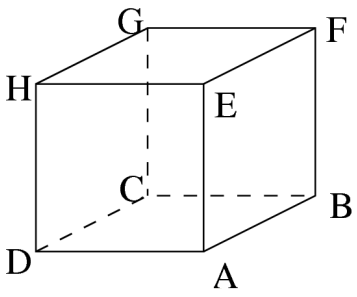


15. The ratio of an interior angle to an exterior angle of a regular polygon is $5 : 1$. Find the number of sides of the polygon.

16. The figure below shows an arrow, with length 14 cm, in its starting position. The arrow is turned clockwise and makes 7 complete rounds plus 202.5^o. Find the length of the path passed by the tip of the arrow. (Use $\pi = \frac{22}{7}$.)



17. A plane cuts a cube through vertex A into two parts. If the cross section formed by cutting the cube is an equilateral triangle, find the number of ways to cut the cube.



18. Hyde has some candies. Every day, he eats one half of the remaining candies from the previous day, plus one more candy. After five days all the candies were gone. How many candies does Hyde have originally?

19. The number N has the following properties:

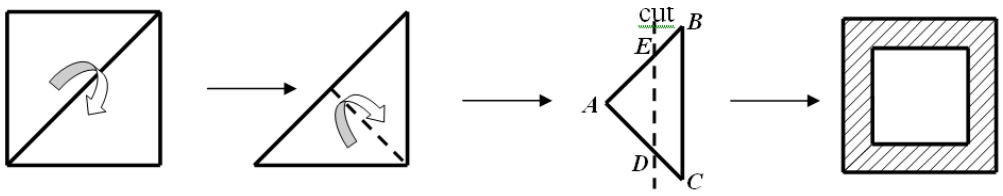
    (a) It consists of 4 digits, each digit is a number less than 7.

    (b) It is a square of a certain number.

    (c) If 3 is added to each digit, the resulting number is also a square of a number.

    Find N.

20. A square piece of paper 12 cm by 12 cm is folded, cut and unfolded as shown. If $AE : EB = 5 : 3$, what is the area of the shaded region?



21. A box without top cover (Figure B) is formed from a square carton size 34 cm $\times$ 34 cm (Figure A) by cutting the four shaded areas. If the sides of each shaded square are whole numbers, find the largest possible volume of the box.

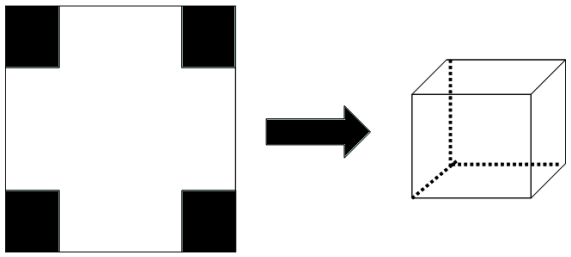
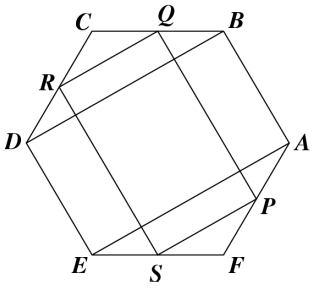


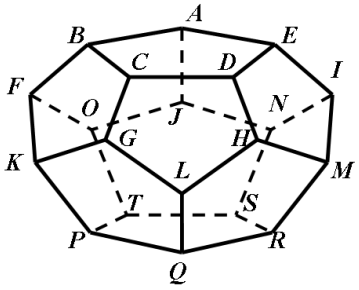
FIGURE A FIGURE B

22. Let N be a 6-digit number. Its first digit is 1. If the first digit is moved to become the last digit, the resulting number is three times N. Find N.

23. The following figure shows a regular hexagon $ABCDEF$. Each of the points $P,\ Q,\ R$ and S is the midpoint of a side of $ABCDEF$. Find the ratio of the area of rectangle $ABDE$ to the area of rectangle $PQRS$.



24. An ant sits at a vertex of a dodecahedron with edge length 1 meter. The ant moves along the edges of the dodecahedron and comes back to the original vertex without visiting any other vertex more than once. How many meters is the longest journey? (This dodecahedron has 12 faces and 30 equal edges.)



25. The display of a digital clock is of the form MM : DD : HH : mm, that is, Month : Day : Hour : minute. The display ranges are

    Month (MM) from 01 to 12

    Day (DD) from 01 to 31

    Hour (HH) from 00 to 23

    Minute (mm) from 00 to 59

    How many times in the year 2005 does the display show a palindrome? (A palindrome is a number which is read the same forward as backward. Examples: 12 : 31 : 13 : 21 and 01 : 02 : 20 : 10.)