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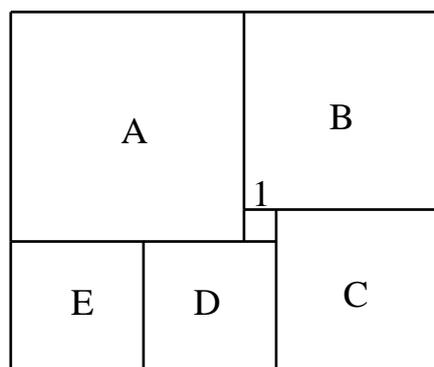
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# 2014 Taiwan Selection Test for PMWC and EMIC

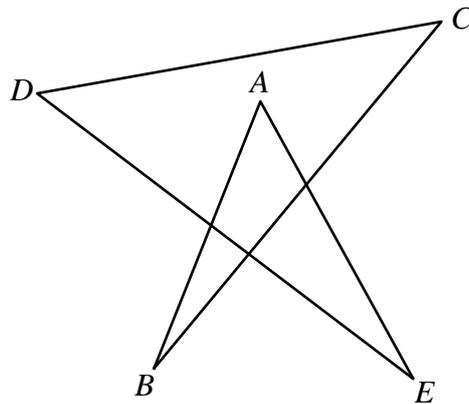
## Intermediate Round Paper I (Time Allowed : 90 Minutes)

- Write down all answers on the answer sheet. Each problem is worth 10 points and the total is 120 points.

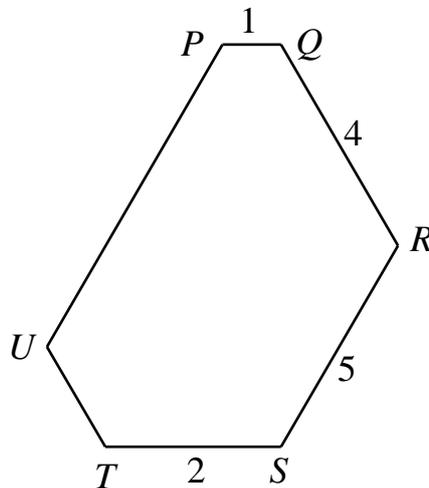
1. In selling two cell-phones for 6000 dollars each, a merchant gains 20% in one sale and loses 20% in the other. What is the net gain or net loss?
2. A red marker and a black marker are placed on two squares of an  $8 \times 8$  chessboard which may not be rotated or reflected. How many different placements are there if the two markers may not be in the same row or in the same column?
3. A car goes uphill at 30 kph and then immediately returns downhill at 50 kph to its starting point. If the round trip takes 4 hours, how far, in km, has the car travelled uphill?
4. Seven straight lines on the plane meet each others. The measure of the angle between any two lines is an integral number of degrees. What is the maximum measure, in degrees, of the smallest angle between two of the lines?
5. When Jerry was born, his sister's age was  $\frac{1}{4}$  of his mother's age. Now his age is  $\frac{1}{4}$  of the age of his mother while his sister's age is  $\frac{1}{3}$  of his father's age. In nine more years, Jerry's age will be  $\frac{1}{3}$  of the age of his father's age. How old is Jerry's sister now?
6. The diagram below shows a rectangle divided into six squares. Five of them are labelled A, B, C, D and E. If the side length of the sixth square is 1 cm, what is the area, in  $\text{cm}^2$ , of the rectangle?



7. Three brothers have 99, 63 and 54 dollars respectively. They agree to share their wealth in the following way. Each step involves only two of them. The one with more money will give some to the other so that he will have twice as much as before. After three moves, what is the minimum value of the largest difference between the amounts of money of the brothers?
8. In the diagram below, determine  $\angle A + \angle B + \angle C + \angle D + \angle E$ , in degrees.



9. What are the last two digits of the product of 2014 copies of 7?
10.  $PQRSTU$  is a hexagon in which all angles are  $120^\circ$ . If  $PQ = 1$  cm,  $QR = 4$  cm,  $RS = 5$  cm and  $ST = 2$  cm, what is the perimeter, in cm, of  $PQRSTU$ ?



11. The units digit of a positive integer is 2. If we move it to the other end, we get a new number which is twice the old number. What is smallest possible value of the old number?
12. Find the smallest positive integer which leaves 64 as the remainder when divided by 150 and 51 as the remainder when divided by 151.

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## Intermediate Round Paper II (Time Allowed : 60 Minutes)

- Complete solutions of problem 1 and 3 are required for full credits. Partial credits may be awarded. Only answers are required for problem number 2 and 4. Each problem is worth 25 points and the total is 100 points.
1. Find all two-digit numbers such that when multiplied by any positive one-digit number, its digit-sum does not change.

Answer : \_\_\_\_\_

2. Put each of the nine numbers 1, 1, 5, 5, 5, 5, 10, 10 and 10 into a different square of a  $3 \times 3$  table so that the sum of the three numbers in each row and in each column is different.

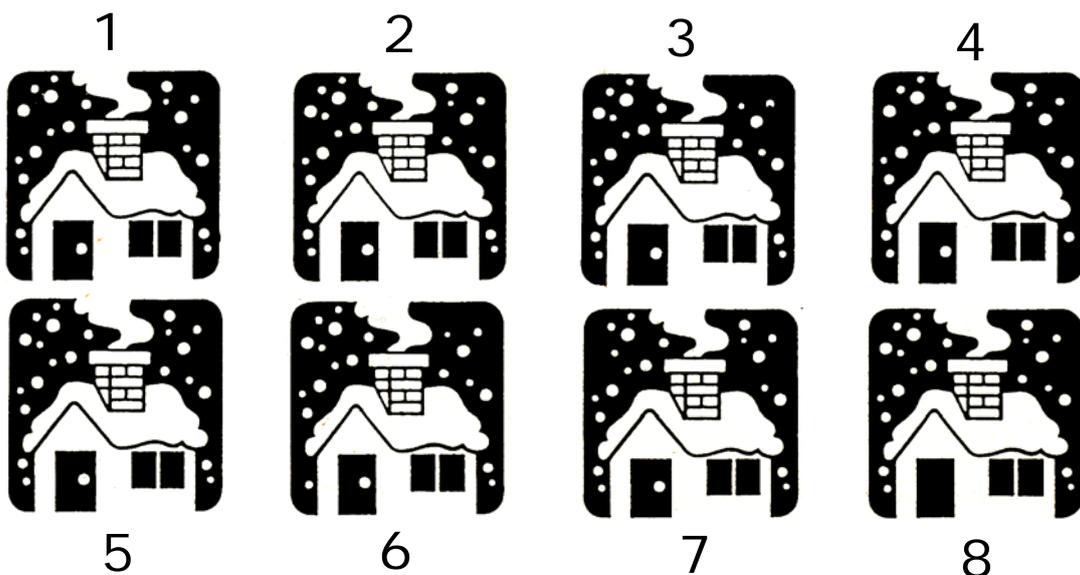


Answer : \_\_\_\_\_

3. Boris picks at random a ten-digit number 7804320512. Anna picks five positive integers  $a, b, c, d$  and  $e$ , and Boris tells her the value of  $78a + 4b + 32c + 5d + 12e$ . What is the minimum number of times Anna has to do this to be able to deduce that Boris' number is 7804320512?

Answer : \_\_\_\_\_

4. Can you determine which two pictures are identical?



Answer : \_\_\_\_\_