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2012 Middle Primary Division Second Round Solution

1. Because $86=10\times8+6=20\times4+6=30\times2+26=40\times2+6=80\times1+6$, the remainder is 6. So 30 cannot be the value of the quotient.

Answer：(C)

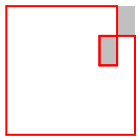
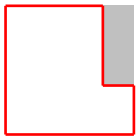
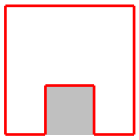
2. The sum of numbers of 14 athletes is 1+2+3+…+13+14=105, and 105－100=5. That is, this extra 5 is Edmond's number.

Answer：(A)

3. Arrange a gift and a gift box in pairs, there are 9 condition: (30, 20), (30, 50), (30, 80), (60, 20), (60, 50), (60, 80), (90, 20), (90, 50), (90, 80). The sums of two numbers in parentheses are 50, 80, 110, 80, 110, 140, 110, 140, 170. So there are totally 5 different possible prices: 50, 80, 110, 140, 170.

Answer：(B)

4. The perimeter of (A) is longer than the original one; that of (B) is equal to the original one; that of (C) is longer than the original one; that of (D) is longer than the original one; that of (E) is shorter than the original one.

（A）  （B）  （C） （D）  （E）

So we choose (B).

Answer：(B)

5. If the man does not stand upside down, he should see 2002 in the mirror. If he doesn't see the number in the mirror, he should see 5006. Hence, the number on the shirt is 5006.

Answer：(C)

6. Assume that the weight of box B is 1 unit, than the weight of box A is 4 units. That is, the weight of box A is 3 units more than box B. Hence, 3 units are equal to 12 kilograms, 1 unit is equal to 12÷3=4 kilograms. So the weight of box A is 4×4=16 kilograms.

Answer：16 kg

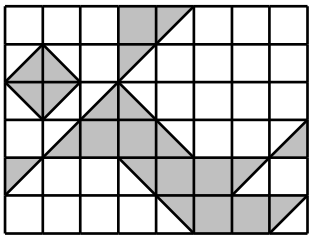
7. If we want to know Mark's average speed, we should find out how long he walked and how long he spent. The distance he walked is totally 3000 × 2 = 6000 meters. The time he spent from home to the park is 3000 ÷ 100 = 30 minutes; that of he spent from the park to home is 3000 ÷ 150 = 20 minutes, totally 30 + 20 = 50 minutes. So Mark's average speed is 6000 ÷ 50 = 120 meters per minute.

Answer：120 m per minutes

8. If we want to find out the smallest three-digit number, the hundreds digit should be as small as possible, so the second card should be placed on the left side. The numbers correspond to 1 are 8 and 9. To get the smallest three-digit number, the tens digit should be smaller than the single digit. So the third card is in the middle, and the first card is on the right side. Hence, the smallest number we get is 189.

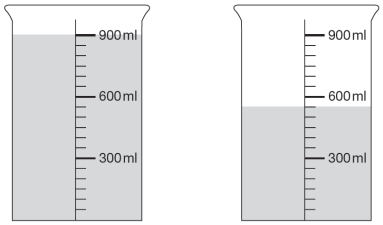
Answer：189

9. The shaded area consists of 16 triangles, which are equal to 8 squares, and 7 squares. So there are 8 + 7 = 15 squares are colored. That is, the shaded area is 15 cm^2.



Answer：15 cm^2

10. Notice that the water in the left cylinder is 900－600 = 300 ml milliliters more than the right that in the right one, so we should pour 300 ÷ 2 = 150 milliliters into the right cylinder.



Answer：150 ml

11. Observe that the denominators are all 40. When we add 2 to the numerator, the fraction becomes 0.05 larger than the original one. Because 27 is 2 smaller than 29, the result should 0.05 smaller than 0.725, that is, 0.675.

Answer：0.675

12. **【Solution 1】** We can get 2 strands of rope when folding for one time; 4 strands of rope when folding for two times; 8 strands of rope when folding for three times; 16 strands of rope when folding for four times; 32 strands of rope when folding for five times. If we cut the rope in halves after folding five times, the rope will be cut at 32 different places. That is, it will separate into 33 pieces.

【Solution 2】 the pieces we get when cutting in halves after folding for several times have the rule as follow:

Cut the rope in halves after folding for 1 time, we will get $2^1+1=3$ pieces;
Cut the rope in halves after folding for 2 time, we will get $2^2+1=5$ pieces;
Cut the rope in halves after folding for 3 time, we will get $2^3+1=9$ pieces;
Cut the rope in halves after folding for 4 time, we will get $2^4+1=17$ pieces;
Cut the rope in halves after folding for 5 time, we will get $2^5+1=33$ pieces.

Answer：33 pieces

13. **【Solution 1】** Ben was (6－4)×2=4 km behind Andy when he rode on the bike, so it took him 4÷(10－6)= 1 to catch up with Andy. At the same time, they arrived at town B together. Therefore, it took Andy 3 hours to arrive town B from town A. Then, the distance between two towns is 6×3=18 km.

【Solution 2】 Assume that it took Ben t hours to arrive town B after starting to ride the bike, so

$$2\times4+10t=2\times6+6t,\ t=1.$$

Therefore, the distance between town A and town B is $2\times4+10\times1=18$ km.

Answer：18 km

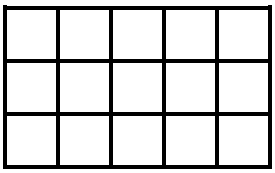
14. If we want to know the minimum total value, Jerome and Roberta should both have 1-dollar coin. Hence, Jerome has 4 dollars, Roberta has 3 dollars. (5 marks)
However, from the problem we know that Jerome's 4 coins are 3 dollars less than Roberta's 3 coins, and there are only two different kinds among these coins. Assume that the coins Roberta has are all 2-dollar, then he has 6 dollars, while his money is only 2 dollars more than Jerome's. So Roberta must have a 5-dollar coin and two 1-dollar coins. **(10 marks)**
Hence, their minimum total value is $5 + 1 + 1 + 1 \times 4 = 11$ dollars. (5 marks)

Answer：11 dollars

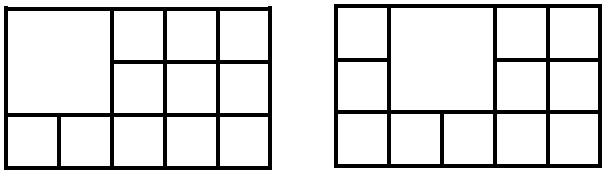
【Marking Scheme】
Only exact solution without the solving process, 5 marks.

15. Because we will use at most two pieces of square of 2 cm when making paper which length is 5 cm and width is 3 cm, so we turn the problem into several cases: (5 marks)

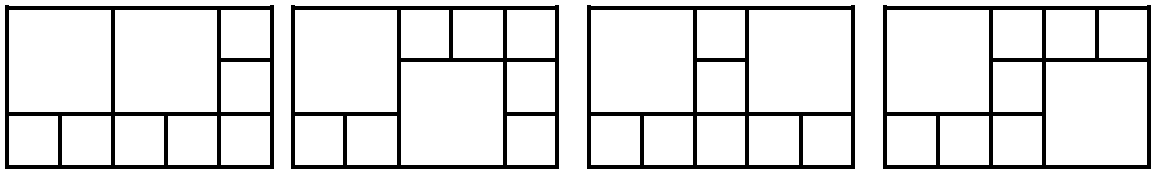
（Case 1）There is only 1 way if we use only squares of 1 cm: (5 marks)



（Case 2）We use one piece of square of 2 cm. According to the symmetry, there are 2 ways to make the paper: (5 marks)



（Case 3）We use two pieces of squares of 2 cm. According to the symmetry, there are 4 ways to make the paper: (5 marks)



To sum up, there are 7 different ways.

Answer：7 ways

【Marking Scheme】
5 marks for finding out that at most 2 pieces of squares of 2 cm, and turning the problem into different cases by pieces of squares of 2cm.
5 marks for each exactly discussion of situation;
Only exact solution without the solving process, 5 marks.