Mathlete Training Centre
SMOPS 2002

1. (SMOPS 02Q1) How many numbers are there in the following number sequence?

   1.11, 1.12, 1.13, ..., 9.98, 9.99.

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2. (SMOPS 02Q2) What is the missing number in the following number sequence?

   $\frac{1}{2}, \frac{1}{12}, \frac{1}{30}, \frac{1}{56}, \square, \frac{1}{132}$.

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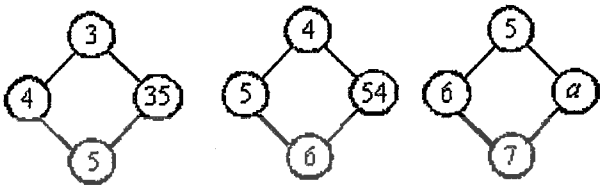
3. (SMOPS 02Q3) Observe the pattern and find the value of a.



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4. (SMOPS 02Q4) Find the value of $\frac{1}{2002} + \frac{2}{2002} + \frac{3}{2002} + \cdots + \frac{2000}{2002} + \frac{2001}{2002}$.

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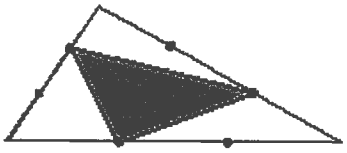
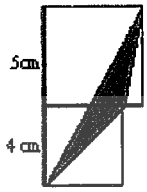
5. (SMOPS 02Q5) The average of 10 consecutive odd numbers is 100. What is the greatest number among the 10 numbers?

6. (SMOPS 02Q6) What fraction of the figure is shaded, when each side of the triangle is divided into 3 equal parts by the points?



7. (SMOPS 02Q7) The figure is made up of two squares of sides 5cm and 4cm respectively. Find the shaded area.



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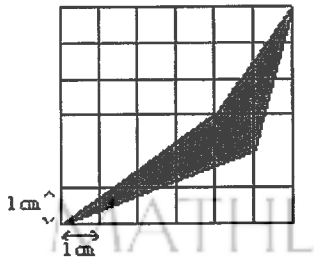
8. (SMOPS 02Q8) Find the area of the shaded figure.



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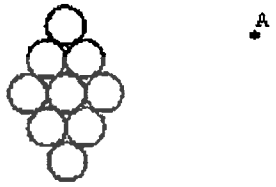
9. (SMOPS 02Q9) Draw a straight line through the point A to divide the 9 circles into two parts of equal area.



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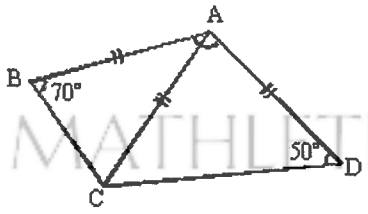
10. (SMOPS 02Q10) In the figure, $AB = AC = AD$, $\angle ABC = 70°$ and $\angle ADC = 50°$. Find $\angle BAD$.



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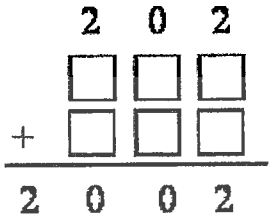
11. (SMOPS 02Q11) In the sum, each white box represents a non-zero digit. What is the sum of all the 6 missing digits?



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12. (SMOPS 02Q12) The average of n whole numbers is 80. One of the numbers is 100. After removing the number 100, the average of the remaining numbers is 78. Find the value of n.

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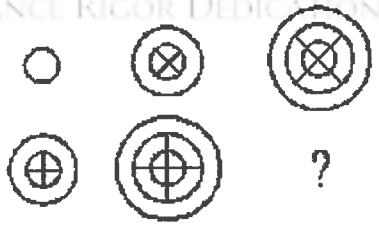
13. (SMOPS 02Q13) The list price of an article is \$6000. If it is sold at half price, the profit is 25%. At what price must it be sold so that the profit will be 50%?

14. (SMOPS 02Q14) $\frac{1}{7}$ of a group of pupils score A for Mathematics, $\frac{1}{3}$ of the students score B, $\frac{1}{2}$ of the pupils score C and the rest score D.

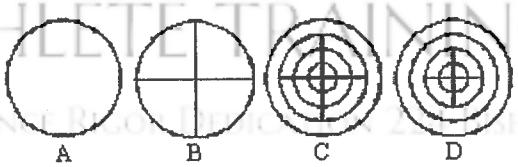
    If a total of 100 pupils score either A or B, how many pupils score D?

15. (SMOPS 02Q15) At 8.00 a.m., car A leaves Town P and travels along an expressway. After some time, car B leaves Town P and travels along the same expressway. The two cars meet at 9.00 a.m. If the ratio of A's speed to B's speed is 4 : 5, what time does B leave Town P?

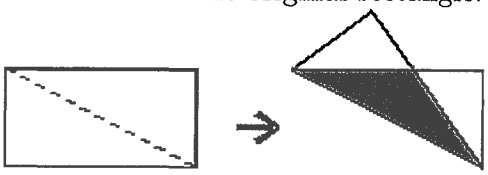
16. (SMOPS 02Q16)



Which one of the following is the missing figure ?



17. (SMOPS 02Q17) A rectangle is folded along a diagonal as shown. The area of the resulting figure is $\frac{5}{8}$ of the area of the original rectangle. If the area of the shaded triangle is 18 cm^2, find the area of the original rectangle.



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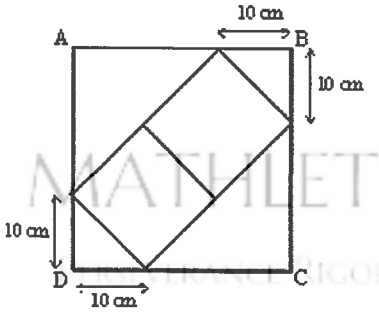
18. (SMOPS 02Q18) The square ABCD is made up of 4 triangles and 2 smaller squares.

Find the total area of the square ABCD.



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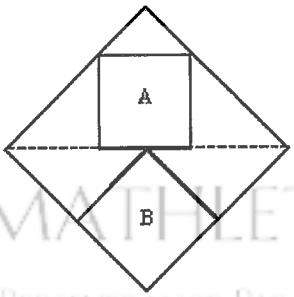
19. (SMOPS 02Q19) The diagram shows two squares A and B inside a bigger square.

    Find the ratio of the area of A to the area of B.



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20. (SMOPS 02Q20) There are 3 straight lines and 2 circles on the plane. They divide the plane into regions. Find the greatest possible number of regions.

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21. (SMOPS 02Q21) The number 20022002...20022002 is formed by writing 2002 blocks of '2002'.
Find the remainder when the number is divided by 9.

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22. (SMOPS 02Q22) Find the sum of the first 100 numbers of the following number sequence.
1, 2, 3, 4, 5, 6, 7, 8, 9, 1, 0, 1, 1, 1, 2, 1, 3, 1, 4, 1, 5, ...

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23. (SMOPS 02Q23) In a number seuqence: $1, 1, 2, 3, 5, 8, 13, 21, \ldots$, starting from the third number, each number is the sum of the two numbers that come just before it.
How many even numbers are there among the first 1000 numbers in the number sequence?

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24. (SMOPS 02Q24) 10 years ago, the ratio of John's age to Peter's age was 5:2. The ratio is 5:3 now. What will be the ratio 10 years later?

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25. (SMOPS 02Q25) David had \$100 more than Allen at first. After David's money had decreased by \$120 and Allen's money had increased by \$200, Allen had 3 times as much money as David. What was the total amount of money they had at first?

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26. (SMOPS 02Q26) Two barrels X and Y contained different amounts of oil at first. Some oil from X was poured to Y so that the amount of oil in Y was doubled. Then, some oil from Y was poured to X so that the amount of oil in X was doubled. After these two pourings, the barrels each contained 18 litres of oil . How many litres of oil were in X at first?

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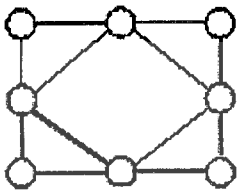
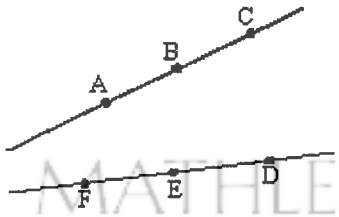
27. (SMOPS 02Q27) In the figure, each circle is to be coloured by one of the colours: red, yellow and blue. In how many ways can we colour the 8 circles such that any two circles which are joined by a straight line have different colours?



28. (SMOPS 02Q28) The points A, B, C, D, E and F are on the two straight lines as shown.

How many triangles can be formed with any 3 of the 6 points as vertices?



29. (SMOPS 02Q29) Patrick had a sum of money.
On the first day, he spent $\frac{1}{4}$ of his money and donated \$30 to charity.
On the second day, he spent $\frac{1}{3}$ of the money he still had and donated \$20 to charity.
On the third day, he spent $\frac{1}{2}$ of the remaining money he still had and donated \$10 to charity.
At the end, he had \$10 left. How much money did he have at first?

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30. (SMOPS 02Q30) Four football teams A,B,C and C are in the same group. Each term plays 3 matches, one with each of the other 3 teams. The winner of each match scores 3 points, the loser scores 0 points and if the match is a draw, both teams score 1 point.

After all the matches, the results are as follows:
(1) The total scores of 3 matches for the four teams are consectutive odd numbers.
(2) D has the highest total score.
(3) A has exactly 2 draws, one of which is the match with C.

Find the total score for each team.

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