Po Leung Kuk

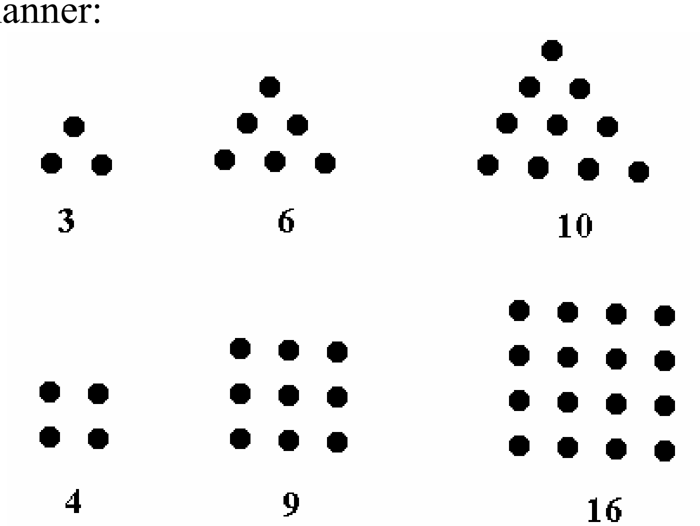
2^{nd} Primary Mathematics World Contest

Individual Contest

I1. Calculate : $\dfrac{1\times2\times3+2\times4\times6+3\times6\times9+4\times8\times12+5\times10\times15}{1\times3\times5+2\times6\times10+3\times9\times15+4\times12\times20+5\times15\times25}$

Answer : $\dfrac{2}{5}$.

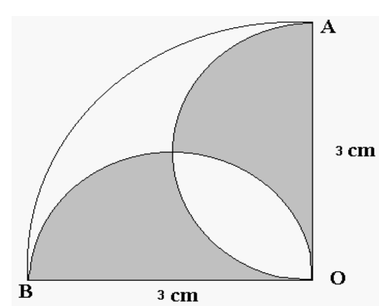
I2. Triangular numbers and Square numbers can be represented in the following manner:



Find a pair of consecutive Triangular Numbers and the difference between a pair of consecutive Square Numbers whose difference are both 11. What is the sum of these four numbers ?

Answer : 182 .

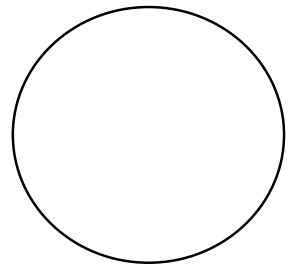
I3. Suppose OB and OA are diameters of the semicircles and OB = OA=3 cm. $\angle$BOA is a right angle. A and B are two points on the circumference of circle of radius OA.
Find the area of the shaded region in cm^2 .



Answer :4.5.

I4. Suppose in each day on a certain planet, there are only 10 hours and every hour has 100 minutes. What is the measure, in degrees, of the acute angle formed by the hour hand and minute hand at 6 o'clock 75 minutes?

Answer: 27^o .



I5. There were many balls which were distributed into 1998 boxes and all these boxes were arranged in a row. If the second box from the leftend contained 7 balls and any 4 consecutive boxes always had a total of 30 balls, how many balls were there in the rightend box?

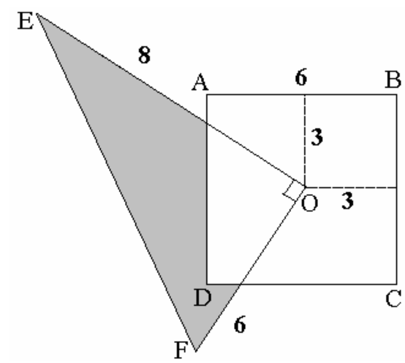
Answer: 7.

I6. After a mathematics test, each of the 25 students in the class got a quick look at the teacher's grade sheet. Each student noticed five A's. No student saw all the grades and no student saw her or his own grade. What is the minimum number of students who scored an A on this test?

Answer: 6.

I7. In the figure, ABCD is a 6×6 square with centre O. EOF is a right-angled triangle with OE=8 and OF=6. Find the area of the shaded region.

Answer : 15.



I8. A boy arranges three kinds of books which are 30 mm, 24 mm, and 18 mm thick, respectively. He places only books of the same thickness into 3 stacks of equal height, and wants to make the height as small as possible. How many books would be used in this arrangement?

Answer : 47.

I9. How many triangles are there with side lengths whole numbers and with a perimeter of 10 cm ?

Answer : 2.

I10. Find the number of factors of 960.

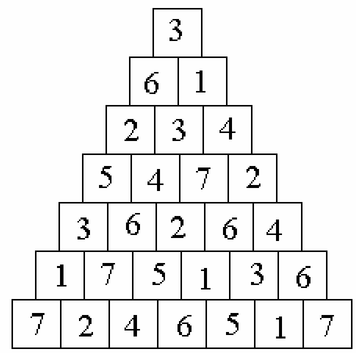
Answer : 28.

I11. What is the unit digit of $2^{1998} + 3^{1998}$?

Answer : 3.

I12. In the pyramid in the diagram, start from the top square containing the number 3. In each step, go to either of the two squares immediately below. Stop when the bottom row is reached. If the number in the seven squares passed over are different from one another, determine the number in the destination square on the bottom row.

Answer : 6.



I13. Every year there is at least one Friday the thirteenth, but no year has more than three. This year there are exactly three : in February, March and November. When will the next year be that contains exactly three Friday the thirteenth's?

Answer : 2009.

I14. Arrange all fractions of the form $\frac{m}{n}$ in a row where m and n are counting numbers and satisfy the following conditions:

(a) If a $\times$ b $< m_2 \times n_2$, ,then $\frac{m_1}{n_1}$ must be placed before $\frac{m_2}{n_2}$,

(b) If $m_1 \times n_1 = m_2 \times n_2$, and $n_1 < n_2$, then $\frac{m_1}{n_1}$ must also be placed before $\frac{m_2}{n_2}$ . .

How many fractions are there between $\frac{1998}{1}$ and $\frac{1}{1998}$?

Answer: 14.

I15. Construct a rectangle by putting together nine squares with sides equal to 1, 4, 7, 8, 9, 10, 14, 15 and 18. What is the sum of the areas of the squares on the 4 corners of the resulting rectangle ?

Answer: 826.