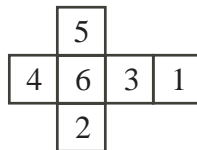


2006 Fryer Contest (Grade 9)
Thursday, April 20, 2006

1. Samantha receives the following marks out of 100 in seven of her eight courses:

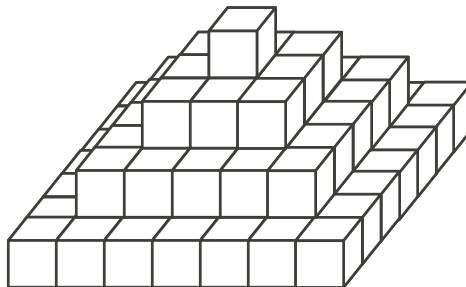
Math	94
Science	93
English	84
Art	81
History	74
Phys Ed	83
Geography	79

- (a) Determine her average mark in these seven courses.
- (b) Before she finds out her actual French mark, Samantha calculates the highest possible average that she could obtain in all eight courses. Determine this average.
- (c) When Samantha actually finds out her French mark, it turns out that her average in all eight courses is 85. What is her actual French mark?
2. Dmitri has a collection of identical cubes. Each cube is labelled with the integers 1 to 6 as shown in the following net:



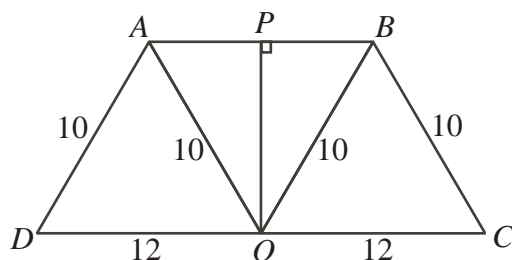
(This net can be folded to make a cube.)

He forms a pyramid by stacking layers of the cubes on a table, as shown, with the bottom layer being a 7 by 7 square of cubes.

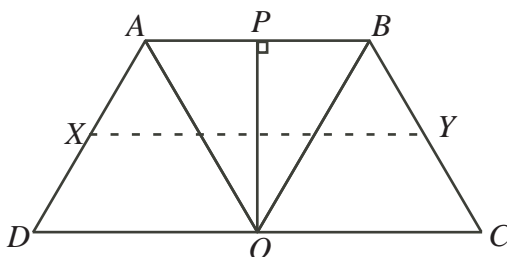


- (a) Determine the total number of cubes used to build the pyramid. Explain how you got your answer.
- (b) How many faces are visible after the pyramid is built and sitting on the table?
- (c) Explain in detail how he should position the cubes so that if all of the visible numbers are added up, the total is as large as possible. What is this total?

3. Three congruent isosceles triangles DAO , AOB and OBC have $AD = AO = OB = BC = 10$ and $AB = DO = OC = 12$. These triangles are arranged to form trapezoid $ABCD$, as shown. Point P is on side AB so that OP is perpendicular to AB .



- (a) What is the length of OP ? Explain how you got your answer.
- (b) What is the area of trapezoid $ABCD$? Explain how you got your answer.
- (c) Point X is the midpoint of AD and point Y is the midpoint of BC . When X and Y are joined, the trapezoid is divided into two smaller trapezoids. What is the ratio of the area of trapezoid $ABYX$ to the area of trapezoid $XYCD$? Explain how you got your answer.



4. (a) How many of the positive integers from 1 to 100, inclusive, do not contain the digit 7? Explain how you got your answer.
- (b) How many of the positive integers from 1 to 2000, inclusive, do not contain the digit 7? Explain how you got your answer.
- (c) Determine the sum of all of the positive integers from 1 to 2006, inclusive, that do not contain the digit 7. Explain how you got your answer.