Part A: Each question is worth 3 points.

1. A kangaroo is jumping from Bucharest to Paris (2500 km), doubling the length with each jump. If the first one is 1 m long, after how many jumps will the kangaroo be closest to Paris?

A. 11   B. 12   C. 22   D.20   E. 21

2. Robert looks at his genealogical tree where only men are indicated. The arrows are directed from fathers to sons. What is the name of the son of the brother of the grandfather of the brother of Robert's father?
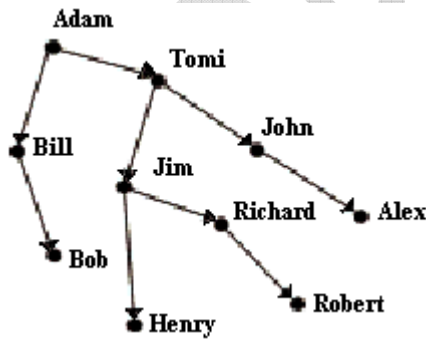
A. Jim   B. Alex   C. Tom   D. Bob   E. another answer

3. One face of a polyhedron is a pentagon. What is the smallest number of faces the polyhedron can have?

A. 5   B. 6   C. 7   D. 8   E. 10

4. The occupancy rate of a hotel is 88% for the three summer months and 44% for the rest of the year's months. What is the average occupancy percentage for the whole year?

A. 132%   B. 66%   C. 55%   D. 44%   E. another answer

5. A part of a cylindrical glass is filled with water and tilted by 45°, as shown in the picture. What percentage of the glass is filled ?
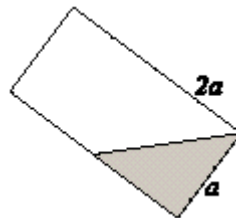
A. less than 25%   B. 25%   C. 33%   D. $33\frac{1}{3}$%   E. more than $33\frac{1}{3}$%

6. If a and b are positive integers with a greatest common divisor of 3, and $a/b=0.4$, what is the product ab?

A. 18   B. 10   C. 36   D. 30   E. 90

7. A prism has 2002 vertices. What is the number of edges of the prism?
A. 3003   B. 1001   C. 2002   D. 4002   E. 2001

8. When freezing, water increases its volume by 1/11. By what part of its volume will ice decrease when it melts and turns back into water?
A. 1/11   B. 1/10   C. 1/12   D. 1/13   E. 1/14

Part B: Each question is worth 4 points.
9. Ten teams played a table tennis tournament (every team played against each of the other teams once). In each game, the winner got 3 points, the loser got 0 points, and in case of draw, each of the two teams got 1 point. The total number of points given to all teams was 130. How many games finished with a draw?
A. 1   B. 2   C. 3   D. 4   E. 5

10. Introducing a certain invention we can reduce production expenses by 50%; introducing another invention - by 40%, and introducing a third invention - by 10 %. By how many per cent will the production expenses be reduced after introducing all the three inventions at the same time (the inventions are independent)?
A. 100%   B. 73%   C. 92%   D. 87%   E. 67%

11. Peter and his son, and John and his son went fishing. Peter caught as many fishes as his son did. John caught three times as many fishes as his son did. They caught 35 fishes altogether. The name of Peter's son was Luke. What is the name of John's son?
A. This situation is impossible.   B. John   C. Peter
D. Luke   E. There is not enough information to find out.

12. The modern statue on the diagram was made by cutting a rectangular prism out of a stone that originally had the shape of a cube. The volume of the original cube was $512 dm^3$. What is the surface area of the statue on the diagram?
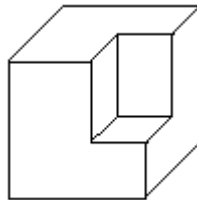
A. $320 dm^2$ B. $336 dm^2$ C. $384 dm^2$ D. $468 dm^2$ E. there is not enough information

13. How many weights C can balance one weight B?

A. 2   B. 3   C. 5   D. 6   E. 7

14. In a container, there are 21 litres of an 18% solution of alcohol. How many litres of it must be replaced by a 90% solution of alcohol in order to obtain a 42% solution of alcohol?

A. 3   B. 5   C. 7   D. 9   E. 11

15. Achilles runs to overtake a crawling tortoise that is ahead of him. At the beginning the distance between them equals 990m. The velocity of Achilles is 10 meters per second, and the velocity of the tortoise is equal to 1 meter per 10 seconds. How long does it take for Achilles to overtake the tortoise?

A. 1 min. 40 sec.   B. 990 sec.   C. 1 min. 39 sec.
D. 1 min. 50 sec.   E. He will never overtake the tortoise.

16. The picture shows 4 triangles having areas A0, A1, A2, A3. The middle triangle (the one with area A0) is a right-angled triangle; the other three triangles are equilateral.
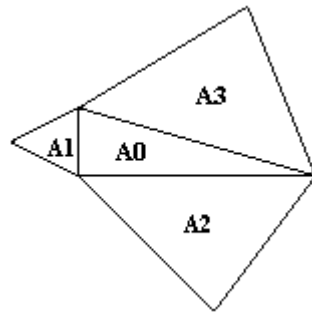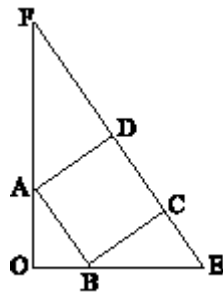

Which of the following must be true?

A. $A1+A2=A3$ B. $(A1)^2+(A2)^2=(A3)^2$ C. $A1+A2+A3=3.A0$
D. $A1+A2=A3.\sqrt{2}$ E. none of them is true

Part C: Each question is worth 5 points.
17. If ABCD is a square, OEF is a right-angled triangle and OA=48, OB=36, what is the length of the segment EF?


A. 176   B. 180   C. 185   D. 188   E. 190

18. In a sequence of positive numbers, each term except the first two is the sum of all preceding terms. The eleventh term of the sequence is 1000, and the first term is 1. What is the second term?

A. 2   B. 93/32   C. 250/64   D. 109/16   E. none of these

19. The "triangle" in the picture consists of circles of the same radius r. The height of the "triangle" is 2. What is the length of the radius r?
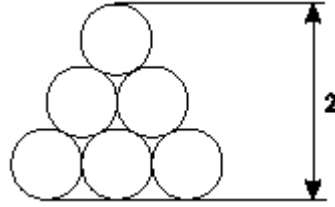
A. $1/(1+\sqrt{3})$ B. $2/(1+\sqrt{3})$ C. $2/(2+\sqrt{3})$ D. $1/(2+\sqrt{3})$ E. none of these

20. Given are 10 points on the plane and all the lines connecting any two or more of them. Five of the points lie on the same line, and no other lines connect more than two of the points. How many triangles are there whose vertices are three of the given points?
A. 20   B. 50   C. 70   D. 100   E. 110

21. Consider the number 2002!=1.2.3……2002 (the product of the numbers from 1 to 2002 inclusive). Clearly 2001 divides 2002! since 2002!=2000!.2001.2002. What is the greatest number k, such that 2001^k divides 2002!?
A. 101   B. 71   C. 69   D. 2   E. 1

22. The points A, B, and C are midpoints of three of the edges of a cube (as shown on the diagram). What is the measure of the angle between the segments AB and BC?
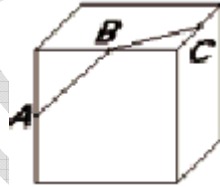
A. $90°$ B. $100°$ C. $110°$ D. $120°$ E. $135°$

23. How many numbers from 1 to 10^{2002} have the sum of their digits equal to 2?
 A. 2007006   B. 2005003   C. 2003001   D. 2005002   E. none of these

24. If $a+b+c=7$, and $\dfrac{1}{a+b}+\dfrac{1}{b+c}+\dfrac{1}{c+a}=\dfrac{7}{10}$, what is $\dfrac{a}{b+c}+\dfrac{b}{c+a}+\dfrac{c}{a+b}$?
A. 19/10   B. 17/10   C. 9/7   D. 3/2   E. 10/7