

BRITISH COLUMBIA SECONDARY SCHOOL MATHEMATICS CONTEST, 2008

Junior Final, Part A

Friday, May 2

1. Jeeves the valet was promised a salary of \$8000 and a car for a year of service. Jeeves left the job after 7 months of service and received the car and \$1600 as his correctly prorated salary. The dollar value of the car was:

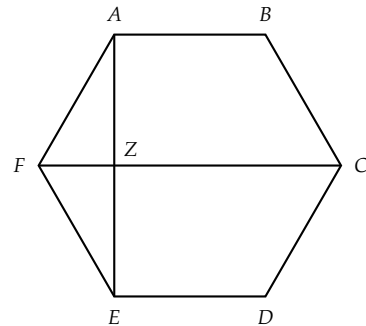
(A) 6400 (B) 7200 (C) 7360 (D) 8000 (E) 15360

2. Recall that $n! = n \times (n - 1) \times (n - 2) \times \cdots \times 2 \times 1$. The maximum value of the integer x such that 3^x divides $30!$ is:

(A) 30 (B) 14 (C) 13 (D) 10 (E) 4

3. In the diagram, $ABCDEF$ is a regular hexagon. Line segments AE and FC meet at Z . The ratio of the area of triangle FZE to the area of the quadrilateral $ABCZ$ is:

(A) 1 : 5 (B) 1 : 4 (C) 4 : 1
(D) 5 : 1 (E) 1 : 6



4. Define $\lfloor x \rfloor$ to be the greatest integer less than or equal to x . For example, $\lfloor 7 \rfloor = 7$, $\lfloor 7.2 \rfloor = 7$, and $\lfloor -5.5 \rfloor = -6$. If z is a real number that is not an integer, then the value of $\lfloor z \rfloor + \lfloor 1 - z \rfloor$ is:

(A) -1 (B) 0 (C) 1 (D) 2 (E) z

5. Examinations in each of three subjects, Anatomy, Biology, and Chemistry, were taken by a group of 41 students. The following table shows how many students failed in each subject, as well as in the various combinations:

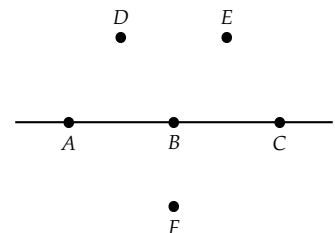
subject	A	B	C	AB	AC	BC	ABC
# failed	12	5	8	2	6	3	1

(For instance, 5 students failed in Biology, among whom there were 3 who failed both Biology and Chemistry, and just 1 of the 3 who failed all three subjects.) The number of students who passed all three subjects is:

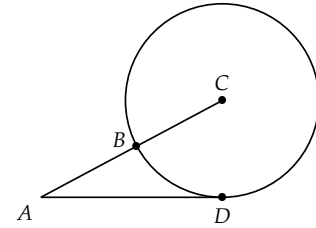
(A) 4 (B) 16 (C) 21 (D) 24 (E) 26

6. Six points, A , B , C , D , E , and F are arranged in the formation shown in the diagram, with A , B , and C on a straight line. Three of these six points are selected to form a triangle. The number of such triangles that can be formed is:

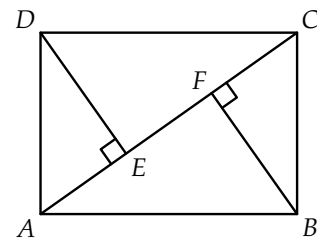
(A) 12 (B) 14 (C) 16
(D) 19 (E) 20



7. In the diagram, C is the centre of the circle and AD is tangent to the circle at D . AC is a straight line. If $\overline{AD} = 10$ and $\overline{AB} = 7$, the length of BC is:



- (A) $\frac{\sqrt{151} - 7}{2}$ (B) $\sqrt{14}$ (C) $\frac{51}{14}$
 (D) $\frac{\sqrt{51}}{2}$ (E) $\frac{7}{2}$
8. When 2008^{2008} is multiplied out, the units digit in the final product is:
 (A) 8 (B) 6 (C) 4 (D) 2 (E) 0
9. Recall that a prime number is an integer greater than one that is divisible only by one and itself. Consider the set of two digit numbers less than 40 that are either prime or divisible by only one prime number. From this set select those for which the sum of the digits is a prime number, and the positive difference between the digits is another prime number. The sum of the values of the numbers selected is:
 (A) 29 (B) 41 (C) 54 (D) 70 (E) 93
10. In the diagram $ABCD$ is a rectangle with $\overline{AD} = 1$, and both DE and BF perpendicular to the diagonal AC . Further, $\overline{AE} = \overline{EF} = \overline{FC}$. The length of the side AB is:



- (A) $\sqrt{2}$ (B) $\sqrt{3}$ (C) 2
 (D) $\sqrt{5}$ (E) 3