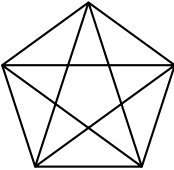


BRITISH COLUMBIA COLLEGES

Junior High School Mathematics Contest, 2002

Preliminary Round

March 6, 2002

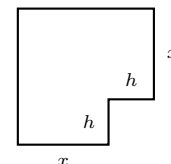
- The year 2002 is a palindromic number, i.e., it reads the same forwards and backwards. The number of years in the third millennium, i.e., between the years 2001 and 3000, that have this property is:
(a) 1 (b) 10 (c) 11 (d) 99 (e) 100
 - I have just won 50 of 75 games of "Free Cell" on the computer. The number of games out of the next 30 games that I must win in order to have won 60% overall is:
(a) 10 (b) 13 (c) 15 (d) 20 (e) 25
 - Mark sold two computers each for \$198. The first was sold for a profit of 10%, the other for a loss of 10%. Overall Mark had:
(a) a loss of \$8 (b) a loss of \$4 (c) no profit or loss
(d) a gain of \$4 (e) a gain of \$8
 - Among the following numbers the one that is a multiple of 9 is:
(a) 1233124 (b) 4623747 (c) 37438974 (d) 67346438 (e) 5955006
 - A boy and a girl are sitting on the steps outside of their school. "I'm a boy", said the one with black hair. "I'm a girl", said the one with red hair. If at least one of them is lying, then:
(a) the boy has red hair and the girl has black hair
(b) the boy has red hair and the girl has red hair
(c) the boy has black hair and the girl has black hair
(d) the boy has black hair and the girl has red hair
(e) the hair colours cannot be determined
 - The number of triangles in the figure is:
(a) 15 (b) 20 (c) 25 (d) 30
(e) more than 30
- 
- If $\frac{a}{b} = \frac{3}{4}$, $\frac{b}{c} = \frac{8}{9}$, and $\frac{c}{d} = \frac{2}{3}$, then the value of $\frac{ad}{b^2}$ is:
(a) $\frac{9}{16}$ (b) $\frac{81}{64}$ (c) $\frac{27}{32}$ (d) $\frac{4}{9}$ (e) $\frac{9}{64}$
 - In the preliminary round of the British Columbia Colleges High School Mathematics Contest there are five points awarded for each correct answer, no points for each incorrect answer, and one point for each unanswered question to a maximum of five unanswered questions. The number of scores between 0 and 75 that are *not* achievable as a valid score for the fifteen questions on the contest is:
(a) 4 (b) 5 (c) 6 (d) 7 (e) more than 8

9. Old Mr. Jones celebrated his 86th birthday with all of his descendents and their spouses, a total of 86 people including Mr. Jones. This included all of his children each with his or her spouse, all of his grandchildren each with his or her spouse, and all of his great grandchildren, none of whom are married. He has three times as many grandchildren as children and three times as many great grandchildren as grandchildren. The number of spouses of his children and grandchildren present is:

(a) 5 (b) 10 (c) 15 (d) 17 (e) 20

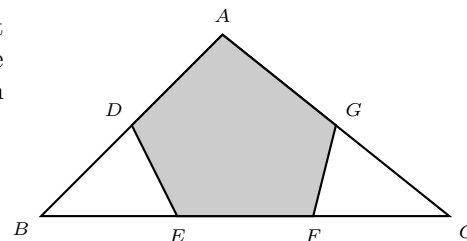
10. In the diagram all adjacent sides meet at right angles. If the area of the figure is 60 square units, and if $3 < x < 5$, then:

(a) $0.5 < h < 3.5$ (b) $1.5 < h < 5.5$ (c) $2.5 < h < 6.5$
 (d) $3.5 < h < 8.5$ (e) $6 < h < 10$



11. In the triangle ABC in the diagram, point D bisects side AB , point G bisects side AC , and the points E and F trisect side BC . If the area of triangle ABC is 84, then the area of the shaded polygon $ADEFG$ is:

(a) $\frac{252}{5}$ (b) $\frac{336}{5}$ (c) 42
 (d) 56 (e) 63



12. Antonino has two equal square pieces of cookie dough, each of the same uniform thickness. On one square Antonino makes the largest possible circular cookie and on the other he makes sixteen equal circular cookies. Assuming each circle is inscribed in identical non-overlapping square sections which comprise the whole of the original square piece of cookie dough, the ratio of the volume of the large cookie to the total volume of the sixteen smaller cookies is:

(a) $\sqrt{2} : 1$ (b) $1 : \sqrt{2}$ (c) $2\sqrt{2} : \pi$ (d) $\pi : 2\sqrt{2}$ (e) $1 : 1$

13. Samantha spent a total of \$420 for daily expenses during her vacation in Mexico. She noted that if she spent \$7 less per day, she could have stayed for another 5 days. The number of days she actually spent on her vacation is:

(a) 15 (b) 18 (c) 22 (d) 29 (e) 30

14. A solid rectangular block with a 5 cm by 5 cm square base has a height of x cm. If the *surface area* of the block is 120 cm^2 , then x equals:

(a) 2 (b) 2.5 (c) 3.5 (d) 4 (e) 4.8

15. The number of real numbers for which the reciprocal of the number is exactly one third of the number is:

(a) 4 (b) infinite (c) 0 (d) 1 (e) 2