

2006-07 Grade 9 CHAMP Math Contest

Part A: (5 credits each)

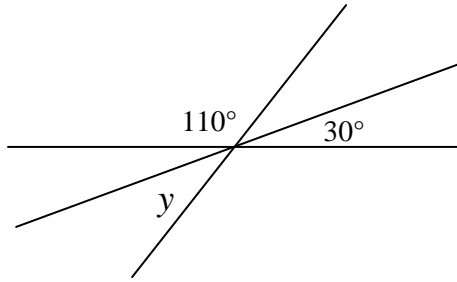
1. There are 64 players signed up to play in a one-on-one basketball tournament where a player is eliminated once they lose one game. How many games in total are required to find a champion?

- a) 64 b) 32 c) 65 d) 66 e) 63

2. The number halfway between $\frac{1}{6}$ and $\frac{9}{10}$ is:

- a) $\frac{9}{16}$ b) $\frac{32}{15}$ c) $\frac{8}{15}$ d) 5 e) $\frac{5}{8}$

3. In the diagram, the value of y is:

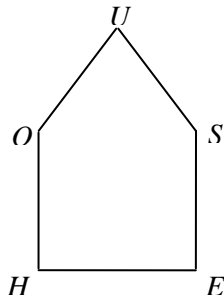


- a) 60° b) 20° c) 30° d) 40° e) 50°

4. What number comes next in the sequence: 4, 7, 13, 25, 49, . . . ?

- a) 61 b) 99 c) 81 d) 80 e) 97

5. The sum, in degrees, of the interior angles of figure HOUSE is:



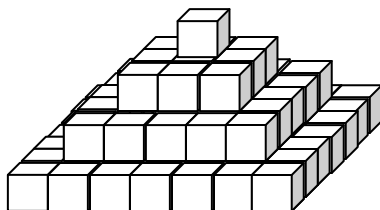
- a) 360 b) 540 c) 720 d) not enough info. to answer e) none of these

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6. If $x \diamond y = 2x - 5y$, find $x \diamond y$ if $x = 5$ and $y = -7$.
a) - 25 b) 45 c) - 32 d) - 39 e) 60
7. If the sum of nine consecutive positive integers is 99, what is the largest of the integers?
a) 7 b) 11 c) 15 d) 16 e) 20
8. The value of $2 + \frac{2}{2 + \frac{2}{2 + 2}}$ is:
a) 3 b) 7 c) $2\frac{2}{5}$ d) $2\frac{2}{3}$ e) $2\frac{4}{5}$
9. The point $(-3, 5)$ is rotated 180° about the origin $(0, 0)$ and then reflected in the y -axis. The coordinates of the image are:
a) $(-3, 5)$ b) $(3, -5)$ c) $(-3, -5)$ d) $(3, 5)$ e) none of these
10. Points $A, B, C,$ and D are placed in that order on a line so that $AB = 2BC = CD$. Then BD as a fraction of AD is:
a) $\frac{1}{2}$ b) $\frac{3}{4}$ c) $\frac{2}{5}$ d) $\frac{1}{5}$ e) none of these

Part B: (6 credits each)

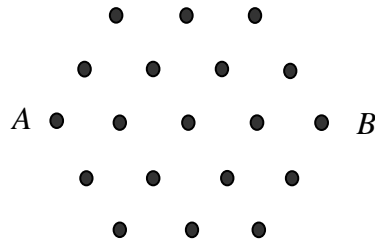
11. A pyramid is constructed with a bottom layer of 7 rows of 7 blocks each. The next layer has 5 rows of 5 blocks each, the next row has 3 rows of 3 blocks each and the last layer is just 1 block. The pyramid is painted except for the bottom. How many blocks have no painted faces?



- a) 91 b) 90 c) 35 d) 55 e) 30

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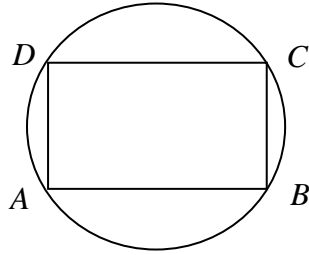
12. Diego and Dora live in Hexaland. If Diego is standing at point A in the diagram and Dora is at point B, how many different paths are possible for Diego to reach Dora? (Note: Diego can only move from left to right in the diagram).



- a) 230 b) 290 c) 181 d) 291 e) 61
13. The mean of a set of integers is 6. The sum of the integers is 18. If two of the integers are -4 and 12 , the median of the set is:
- a) 4 b) 10 c) 6 d) 3 e) none of these
14. A square of side $2x$ has four equilateral triangles drawn on its sides (and exterior to the square). The total area of the figure formed is:
- a) $4x^2 + 4\sqrt{3}x^2$ b) $\frac{1}{4}x^2 + \frac{\sqrt{3}}{4}x^2$ c) $4x^2 + \sqrt{3}x^2$ d) $x^2 + 4\sqrt{3}x^2$ e) none of these
15. The sides of a right-angled triangle are 15, 20, and 25. With the hypotenuse drawn as the base, the length of the altitude drawn to the longest side is:
- a) 12.5 b) 12 c) $\frac{15}{2}\sqrt{2}$ d) 9 e) $10\sqrt{2}$
16. Three tired and hungry men had a bag of apples. When they were asleep, one of them awoke, ate $\frac{1}{3}$ of the apples, and went back to sleep. Later a second man awoke, ate $\frac{1}{3}$ of the remaining apples, and went back to sleep. Finally, the third man awoke and ate $\frac{1}{3}$ of the remaining apples, leaving 8 apples in the bag. How many apples did the first man eat?
- a) 4 b) 9 c) 12 d) 27 e) 72

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17. In the diagram, $ABCD$ is a rectangle in which $AB = 8\text{ cm}$ and $BC = 6\text{ cm}$. Find the area of the circle, in cm^2 .



- a) 10π b) 100π c) 25π d) 20π e) 48π
18. Anna's phone number is *** - ****, where "*" can be any digit from 0 to 9. Here are some clues Anna uses to remember her telephone number:

If you add the first two digits you get the third one.
The first two digits are consecutive.
The sixth digit is 2 less than the seventh digit.
The third and the sixth digit are the same.
If the fourth digit is the side of a square, the fifth one is its area.
The fourth digit is a prime and even number.
The last digit is 9.

Anna's phone number is:

- a) 235 - 2459 b) 347 - 2479 c) 347 - 3979 d) 459 - 1279 e) none of the above
19. The first six triangular numbers are 1, 3, 6, 10, 15, and 21. What is the sum of the 24th and 25th triangular numbers?
- a) 625 b) 576 c) 325 d) 49 e) none of these
20. Person A can complete a job in 6 days. Person B can complete the same job in only 4 days. Working together, they could complete the job in:
- a) 10 days b) 5 days c) 3 days d) $\frac{12}{5}$ days e) $1\frac{1}{2}$ days

Part C: (8 credits each)

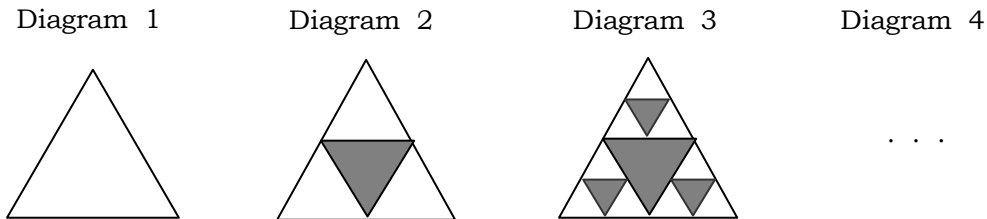
21. There are four possible routes from Algetown to Binomialville. From Binomialville to Calculand, there are five possible routes. From Calculand to Derivilla, there are three possible routes. How many routes can be taken from Algetown to Derivilla and back without taking the same route on any section of the return trip as was used on the trip from Algetown to Derivilla?

- a) 3600 b) 84 c) 120 d) 1440 e) 1920

22. Find the smallest positive integer by which $2^9 \times 3^{14} \times 5^{15} \times 6^3$ must be multiplied to form a perfect square.

- a) 2 b) 5 c) 15 d) 60 e) none of these

23. To create the “Sierpinski Triangle”, the midpoints of a large equilateral triangle are joined together to form four smaller equilateral triangles. The middle triangle is then shaded in. The process is repeated for the remaining unshaded triangles, as shown.



What fraction of the original triangle will have been shaded in for the 4th diagram in the sequence above?

- a) $\frac{7}{16}$ b) $\frac{9}{16}$ c) $\frac{35}{64}$ d) $\frac{37}{64}$ e) $\frac{175}{256}$

24. A large jug is filled with 45 L of apple juice. Nine litres are removed, and the jug is refilled with water. Then nine litres of the mixture are removed and the jug is refilled with water again. The ratio of water to apple juice in the final mixture is:

- a) 6 : 25 b) 9 : 16 c) 2 : 3 d) 2 : 5 e) none of these

25. Consider the set of 3-digit positive numbers, in which none of the digits is zero. The order of the digits in any number of the set is reversed and the non-negative difference between this number and the original number is x. The number of possible values of x is:

- a) 7 b) 8 c) 9 d) 10 e) 11