

Snow College Jr. Mathematics Contest

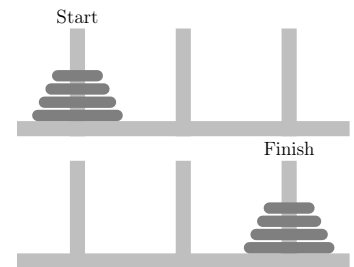
March 19, 2024

Junior Division: Grades 7–9

Form: **T**

Bubble in clearly the single best choice for each question you choose to answer.

- What is the correct time exactly 540 seconds after midnight?
 - 12:09 p.m.
 - 12:09 a.m.
 - 9 p.m.
 - 9 a.m.
 - 12:54 a.m.
- The sum of four consecutive even integers is 148. What is the **sum** of the digits of the smallest of the four?
 - 6
 - 7
 - 9
 - 12
 - 14
- Kim plays basketball for her school. Her free-throw shooting percentage for the season was 75% exactly before today. During tonight's game she makes all five free throws, bringing her percentage up to 80%. How many free throws has Kim made on the season (including tonight)?
 - 20
 - 22
 - 24
 - 25
 - 28
- Towns A, B, and C are at the corners of a triangle with equal sides. A car travels at constant speeds from A to B at 30 mph, from B to C at 40 mph, and from C back to A at 60 mph. What is the average speed for the round trip?
 - 40 mph
 - 43 mph
 - 45 mph
 - 48 mph
 - 50 mph
- Four rings of different sizes are stacked on one of three posts in ascending order (smallest on top). You are able to move one ring at a time (taking the top ring from one post and moving it to another post), but you may never place a larger ring on a smaller ring. What is the minimum number of moves required to move the entire stack to a different post?
 - 12
 - 14
 - 15
 - 16
 - 17
- The product of the lengths of the diagonals of a square is 72. What is the length of the sides of the square?
 - 4
 - 5
 - 6
 - 8
 - 9



7. The shadow cast by a tall tree is 6 m long. At the same time of day and at the same location, an upright meter stick casts a shadow of 20 cm. How tall is the tree?

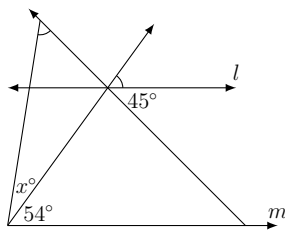
- (A) 20 m
- (B) 24 m
- (C) 27 m
- (D) 28 m
- (E) 30 m

8. The sum of the first n counting numbers is 210: $1 + 2 + 3 + \dots + n = 210$. Find n .

- (A) 14
- (B) 16
- (C) 17
- (D) 20
- (E) 24

9. In the following diagram, lines l and m are parallel. Find the measure of angle x .

- (A) 21°
- (B) 25°
- (C) 27°
- (D) 45°
- (E) 54°



10. Compute the following sum in base 2.

$$\begin{array}{r} 1101101 \\ + 111011 \\ \hline \end{array}$$

- (A) 10001100
- (B) 11010111
- (C) 10110010
- (D) 11011101
- (E) 10101000

11. For the function $f(x) = x^2 + 2x - 5$, compute the value of $f(f(f(1)))$.

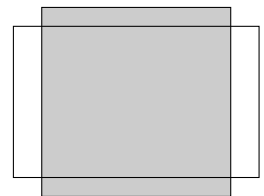
- (A) -5
- (B) 5
- (C) 10
- (D) 12
- (E) 115

12. One cubic centimeter is equal to how many cubic millimeters?

- (A) 10
- (B) 100
- (C) 1000
- (D) 10 000
- (E) 1 000 000

13. One side of the gray square is increased by 3 cm while its adjacent side is decreased by 2 cm. The perimeter of the resulting rectangle is 22 cm. What is the area of the original gray square?

- (A) 9 cm^2
- (B) 16 cm^2
- (C) 25 cm^2
- (D) 64 cm^2
- (E) 121 cm^2

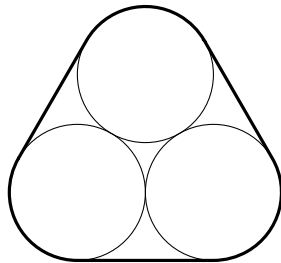


14. Find the intersection point of the diagonals of the parallelogram $ABCD$ for $A(2, -1)$, $B(5, 2)$, $C(7, -3)$, and $D(4, -6)$.

- (A) $(\frac{9}{2}, -2)$
- (B) $(4, -2)$
- (C) $(5, -3)$
- (D) $(\frac{9}{2}, -3)$
- (E) $(\frac{9}{2}, -\frac{5}{2})$

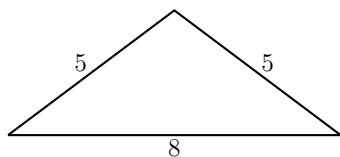
15. Three disks of radius 1 cm are mutually tangent as in the figure below. A rubber band is wrapped around the outside of the group. Find the total length of the band in cm.

- (A) $3 + \pi$
 (B) 3π
 (C) $3 + 2\pi$
 (D) 6π
 (E) $6 + 2\pi$



16. What is the area of the triangle?

- (A) 12
 (B) 12.5
 (C) 20
 (D) 25
 (E) 40



17. The number 6545 can be written as a product of a pair of positive two-digit integers. What is the sum of the two integers?

- (A) 156
 (B) 162
 (C) 187
 (D) 238
 (E) 166

18. Which whole number is closest to the ratio?

$$\frac{10^{2023} + 10^{2025}}{10^{2024} + 10^{2024}}$$

- (A) 1
 (B) 2
 (C) 4
 (D) 5
 (E) 10

19. Find the median: 2, 5, 10, 8, 2, 4, 9, 9, 7, 9.

- (A) 7
 (B) 7.5
 (C) 10
 (D) 9
 (E) 6.5

20. Going only right or down, how many different ways are there to get from point A (upper left corner) to point B (lower right corner) of the 3×4 grid below?

- (A) 28
 (B) 32
 (C) 35
 (D) 56
 (E) 84

