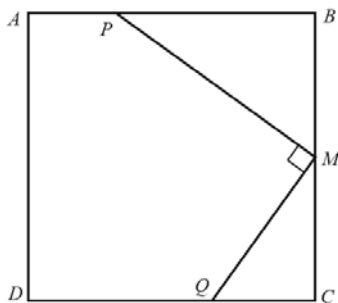


1 In a cube with sides of length 1 m, let one vertex be A . Find the sum of the distances from A to each of the other vertices of the cube.

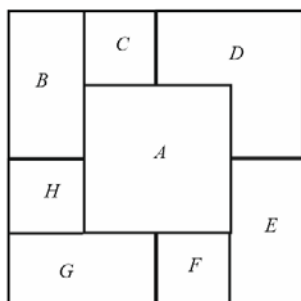
- 2 $ABCD$ is a square with side 1 cm. P is any point on AB , M is the midpoint of BC , and Q is a point on CD such that $MQ \perp PM$. What is the value of $PB \times QC$?



- 3 When a certain integer n is divided by 1995, the remainder is 75. What is the remainder when n is divided by 57?

- 4 How many times does the digit 3 appear if you list all integers from 1 to 1000?

- 5 8 squares of equal size are placed on a table. Square A is seen completely, but the other 7 overlap and can be seen partially. Find the order in which the squares are placed from top to bottom.

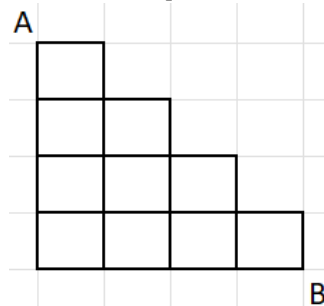


- ISMTF MS Virtual Competition 2023

6 If P is the product of all prime numbers less than 50, what is the value of the units digit of P ?

- a 8 b 5 c 2 d 0

7 How many different paths lead from A to B in the following grid? Moves can only be to the right or downward along the sides of the squares.



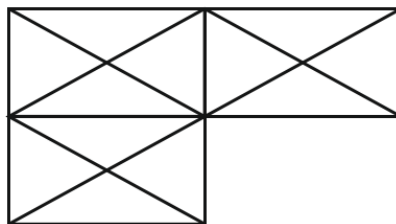
- a 18 b 24 c 42 d 48

8 Each letter stands for one and only one digit. Find the digits.

				SNIP
				NIPS
				PINS

- a SNIP = 9108 b SNIP = 8109 c SNIP = 9180 d SNIP = 9801

9 Three *congruent rectangles* are arranged as shown. How many triangles are in this figure?

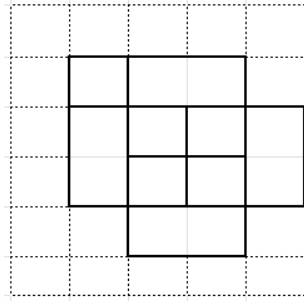


- a 15 b 23 c 29 d 31

10 If six skilled workers can build six wooden huts in six days and 12 unskilled workers can build 12 huts in 12 days, how many huts can 12 skilled workers and 12 unskilled workers build in 12 days?

- a 12 b 18 c 24 d 36

- 11 How many squares are in the figure outlined on the grid? Each small square has a side of 1 unit.



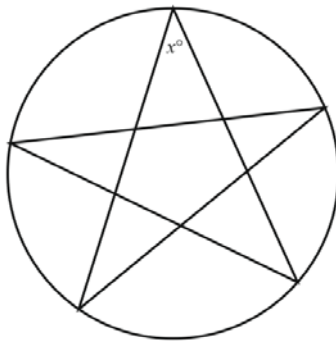
- | | a | 11 | b | 12 | c | 13 | d | 14 |
|----|--|----|---|----|---|----|---|----|
| 12 | <p>Three workers started to dig two holes at 6:00 AM. One of them, working alone, completed his 3 by 3 by 3 hole in one hour. The other two, each working at the same speed as the first , finished their 6 by 6 by 6 hole. How long did it take them?</p> | | | | | | | |

- a 2 hours b 4 hours c 6 hours d 8 hours

- 13 A swimming pool can be filled in 3 days using three hoses and a spout. After two days, those hoses and the spout are turned off and a fire hose is used instead, completing the job in 3 hours. How long would it have taken the fire hose alone to fill the pool?

- a 18 hours b 12 hours c 9 hours d 6 hours

- 14 Find the value of x in this regular inscribed pentagram.

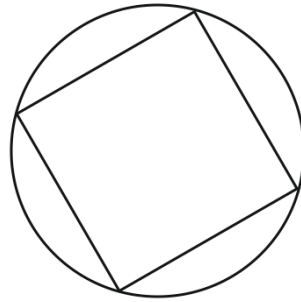


- a 72 b 54 c 36 d 30

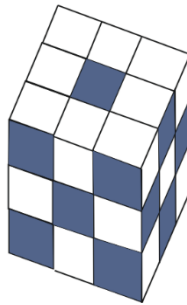
- 15 You walk 30 meters directly east, then 10 m north, then 10 m east again, and finally 20 m north. How far are you from the starting point?

- a 70 m b 60 m c 50 m d 0 m

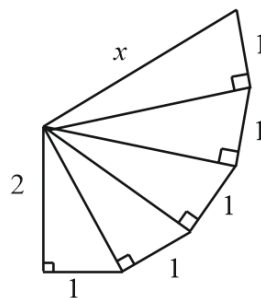
- 16 What portion of the circle's area is inside the inscribed square? Use $\pi = \frac{22}{7}$.



- a 50% b $\frac{7}{11}$ c 70% d not enough information
- 17 Find the smallest integer with the property that division by each of 3, 4, and 5 yields a remainder of 1.
- a 31 b 41 c 56 d 61
- 18 For each face of the large cube below the opposite face is shaded the same way. Find the total number of smaller cubes that must have at least one face shaded.



- a 10 b 16 c 20 d 22
- 19 Half the people in a restaurant left. One third of those remaining ordered dinner? There were 12 people still in the restaurant who did not order dinner. The original number of people at the restaurant was ...
- a 24 b 30 c 36 d 42
- 20 Find the length x in the figure below? Measures are in cm.



- a $\sqrt{5}$ cm b $\sqrt{6}$ cm c $2\sqrt{2}$ cm d 3 cm