

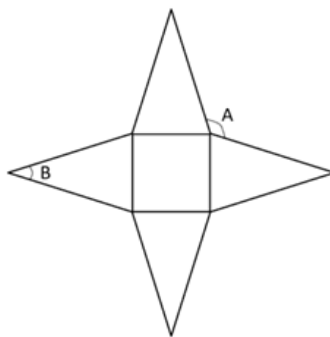
Team ID: _____ Room number: _____
Student names: _____

#	Answer	Points (0/1)
1		
2		
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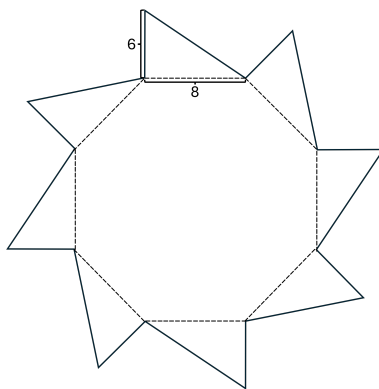
Total:
Graders:

Problems

1. How many non-zero digits are in 11111^2 ?
2. Time drew a square surrounded by four identical isosceles triangles. Angle A is 126 degrees. What is angle B?



3. At Hashemi High School, students have the option of taking Honors Naptime, Competitive Eating, both, or neither. There are 504 students in total at Hashemi High School, and 172 are taking Honors Naptime while 205 are taking Competitive Eating. Out of the whole school, there are 83 students taking both. How many students are taking neither?
4. The hit game Trigonometry Run has an icon, consisting of an octagon surrounded by 8 identical right triangles each with legs of length 6 and 8. What is the perimeter of the icon?



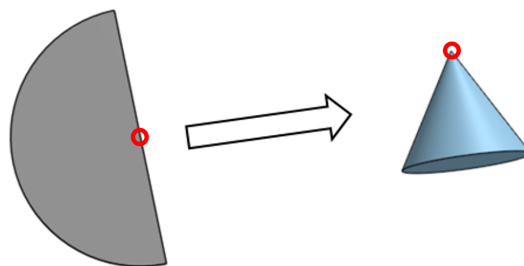
5. In Mathland, money comes in bills worth one dollar, or a prime number of dollars. Andrew has 8 bills in his wallet, that are worth \$1, \$1, \$2, \$2, \$3, \$7, \$19, and \$67. What is the least whole number price that Andrew cannot pay exactly, without needing to receive change?

6. Adi has a number-altering machine “ f ” that takes an input number and outputs a result. If the input is less than zero, it outputs -1 divided by the input. If it is greater than or equal to zero, it outputs the input squared. In other words,

$$f(x) = \begin{cases} -\frac{1}{x} & \text{if } x < 0 \\ x^2 & \text{if } x \geq 0. \end{cases}$$

He puts a mystery integer into the machine once. Afterwards, he puts the output into the machine again, resulting in a final output of $1/49$. What was the mystery integer?

7. Jad rolls up a paper semicircle with radius 1 so that the points on opposite sides of its diameter meet. He then tapes the edges together to form a cone with the circular base missing, and the center of the semicircle becomes the point of the cone. Finally, he cuts out a paper circle to be the base of the cone. What is the cone’s surface area (with the base)? Express your answer as a simplified fraction in terms of pi.



8. Grace is thinking of a number x that is either 1, 2, 3, or 4. She tells you that if you guess the value of x randomly among 1, 2, 3, and 4, the probability that your guess differs from x by exactly 1 is the fraction $\frac{1}{x}$. Find the sum of all possible values of x .
9. A kind sorcerer has a sheet of magic gold leaf paper that is easy to rip.
- First, he gave away half of the sheet, plus an extra half of a square inch of the sheet to nearby pandas.
 - Then, he gave away a third of the remaining sheet, plus a third of a square inch of the sheet to nearby dolphins.
 - Then, he gave away a fourth of the remaining sheet, plus a fourth of a square inch of the sheet to nearby bunnies.

He now has 8 square inches of magic gold leaf paper. How many square inches of gold leaf paper did he originally have?

10. James rolls three standard 6-sided dice. What is the probability that the numbers on the top of the dice can be arranged in a way that forms a palindrome? (A palindrome is a number that reads the same forwards and backwards like 262). Express your answer as a simplified fraction.

Solutions

1. 9
2. 36
3. 210
4. 128
5. 17
6. -7
7. $\frac{3\pi}{4}$ (non-simplified fractions not accepted)
8. 6
9. 35
10. $\frac{4}{9}$ (non-simplified fractions not accepted)