Math Level 2.5 Handouts

Dylan Yu

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§1 Review of AMC 8 and Mathcounts Chapter Sprint

Today we will be discussing **problems 1 to 15** of 2019 AMC 8 and **problems 1 to 15** of 2020 Mathcounts Chapter Sprint. Let's see if you can put together what we've learned! **We will not be using answer choices.**

§1.1 2019 AMC 8

Problem 1.1. Ike and Mike go into a sandwich shop with a total of $30.00 to spend. Sandwiches cost $4.50 each and soft drinks cost $1.00 each. Ike and Mike plan to buy as many sandwiches as they can and use the remaining money to buy soft drinks. Counting both soft drinks and sandwiches, how many items will they buy?

Problem 1.2. Three identical rectangles are put together to form rectangle $ABCD$, as shown in the figure below. Given that the length of the shorter side of each of the smaller rectangles is 5 feet, what is the area in square feet of rectangle $ABCD$?
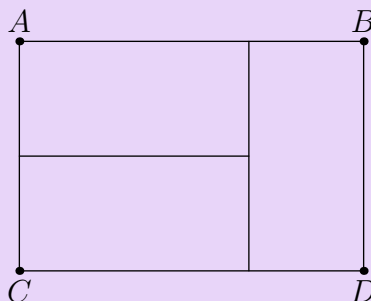

Problem 1.3. Which of the following is the correct order of the fractions $\frac{15}{11}$, $\frac{19}{15}$, and $\frac{17}{13}$, from least to greatest?

Problem 1.4. Quadrilateral $ABCD$ is a rhombus with perimeter 52 meters. The length of diagonal $\overline{AC}$ is 24 meters. What is the area in square meters of rhombus $ABCD$?
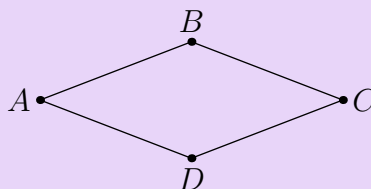

This next one requires answer choices:

Problem 1.5. A tortoise challenges a hare to a race. The hare eagerly agrees and quickly runs ahead, leaving the slow-moving tortoise behind. Confident that he will win, the hare stops to take a nap. Meanwhile, the tortoise walks at a slow steady pace for the entire race. The hare awakes and runs to the finish line, only to find the tortoise already there. Which of the following graphs matches the description of the race, showing the distance d traveled by the two animals over time t from start to finish?
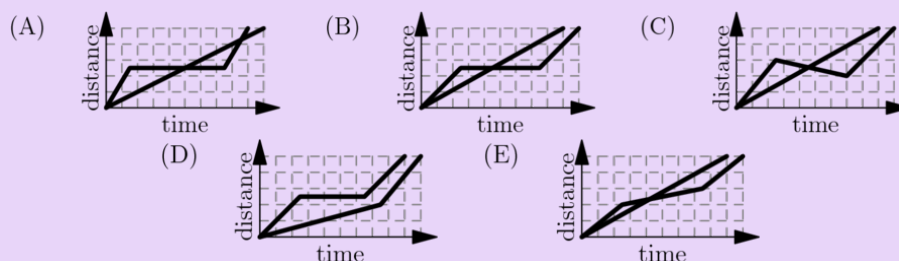
Problem 1.6. There are 81 grid points (uniformly spaced) in the square shown in the diagram below, including the points on the edges. Point P is in the center of the square. Given that point Q is randomly chosen among the other 80 points, what is the probability that the line PQ is a line of symmetry for the square?
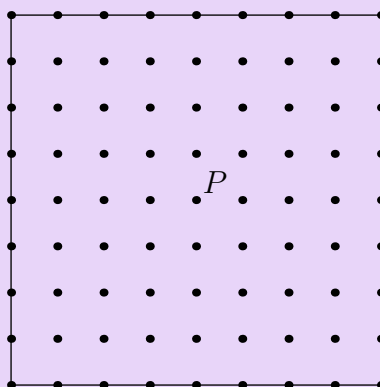

Problem 1.7. Shauna takes five tests, each worth a maximum of 100 points. Her scores on the first three tests are 76, 94, and 87. In order to average 81 for all five tests, what is the lowest score she could earn on one of the other two tests?

Problem 1.8. Gilda has a bag of marbles. She gives 20% of them to her friend Pedro. Then Gilda gives 10% of what is left to another friend, Ebony. Finally, Gilda gives 25% of what is now left in the bag to her brother Jimmy. What percentage of her original bag of marbles does Gilda have left for herself?

Problem 1.9. Alex and Felicia each have cats as pets. Alex buys cat food in cylindrical cans that are 6 cm in diameter and 12 cm high. Felicia buys cat food in cylindrical cans that are 12 cm in diameter and 6 cm high. What is the ratio of the volume one of Alex's cans to the volume one of Felicia's cans?

This next one requires answer choices:

Problem 1.10. The diagram shows the number of students at soccer practice each weekday during last week. After computing the mean and median values, Coach discovers that there were actually 21 participants on Wednesday. Which of the following statements describes the change in the mean and median after the correction is made?

Number of students at soccer practice
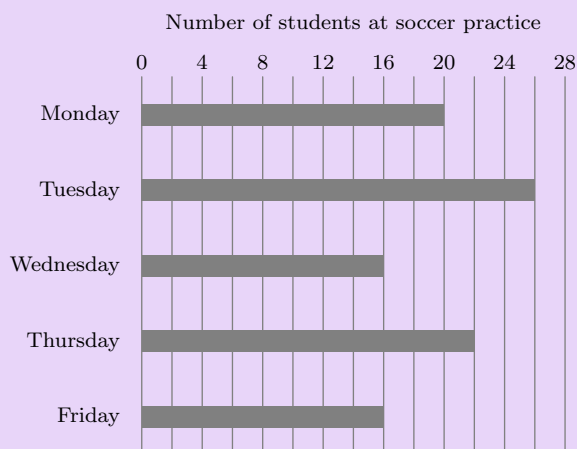
(A) The mean increases by 1 and the median does not change. **(B)** The mean increases by 1 and the median increases by 1. **(C)** The mean increases by 1 and the median increases by 5. **(D)** The mean increases by 5 and the median increases by 1. **(E)** The mean increases by 5 and the median increases by 5.

Problem 1.11. The eighth grade class at Lincoln Middle School has 93 students. Each student takes a math class or a foreign language class or both. There are 70 eighth graders taking a math class, and there are 54 eight graders taking a foreign language class. How many eight graders take only a math class and not a foreign language class?

Problem 1.12. The faces of a cube are painted in six different colors: red (R), white (W), green (G), brown (B), aqua (A), and purple (P). Three views of the cube are shown below. What is the color of the face opposite the aqua face?
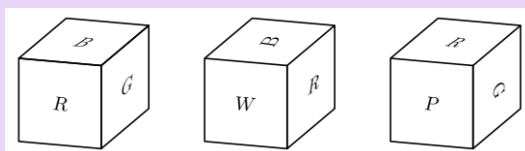
Problem 1.13. A palindrome is a number that has the same value when read from left to right or from right to left. (For example, 12321 is a palindrome.) Let N be the least three-digit integer which is not a palindrome but which is the sum of three distinct two-digit palindromes. What is the sum of the digits of N?

Problem 1.14. Isabella has 6 coupons that can be redeemed for free ice cream cones at Pete's Sweet Treats. In order to make the coupons last, she decides that she will redeem one every 10 days until she has used them all. She knows that Pete's is closed on Sundays, but as she circles the 6 dates on her calendar, she realizes that no circled date falls on a Sunday. On what day of the week does Isabella redeem her first coupon?

Problem 1.15. On a beach 50 people are wearing sunglasses and 35 people are wearing caps. Some people are wearing both sunglasses and caps. If one of the people wearing a cap is selected at random, the probability that this person is is also wearing sunglasses is $\frac{2}{5}$. If instead, someone wearing sunglasses is selected at random, what is the probability that this person is also wearing a cap?

§1.2   2020 Mathcounts Chapter Sprint

Problem 1.16. How many minutes are in 4.5 hours?

Problem 1.17. Herbert's gift basket contains three oranges for every five apples. If the basket has nine oranges, how many apples does it have?

Problem 1.18. If $x = \frac{1}{2}$ and $y = 6$, what is the value of $12xy$?

Problem 1.19. The table shows the minimum and maximum wind speeds for four categories of hurricanes. What is the absolute difference between the minimum wind speed of a category four hurricane and the maximum wind speed of a category one hurricane?

Category	Min Speed	Max Speed
Four	130	156
Three	111	129
Two	96	110
One	74	95

Problem 1.20. What is the perimeter of a square whose area is 144 cm^2?

Problem 1.21. If 3 miles equal 1 league and 1 league equals 24 furlongs, how many furlongs are equal to 1 mile?

Problem 1.22. In quadrilateral $ABCD$, $m\angle A = 119°$, $m\angle B = 89°$, and $m\angle C = 49°$. What is the degree measure of $\angle D$.

Problem 1.23. If the first four terms of a geometric sequence are 2, 4, 8, 16 what is the fifth term of this sequence?

Problem 1.24. Gladys draws two polygons. Her second polygon has two fewer than twice as many sides as her first polygon. If Gladys' first polygon is a triangle, how many sides does her second polygon have?

Problem 1.25. Lolli's Candy Store sells fruit-flavored candy rope, priced by length, at $4.00 per meter. At this rate, how much will it cost to buy 50 cm of candy rope?

Problem 1.26. Misko had an average score of 70 for her first three rounds of golf. If her scores for the first two rounds were 68 and 72, what was her score for the third round?

Problem 1.27. In the figure shown, the shaded inner square has area 36 cm^2, and each of its vertices intersects the midpoint of a side of the outer square. What is the area of the outer square?
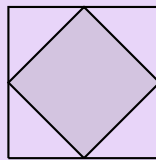
Problem 1.28. Rafa and Sascha played a long 320-point tennis match. If Rafa ran an average of 12.7 meters per point and Sascha ran an average of 11.8 meters per point, how many more meters did Rafa run over the course of the match

Problem 1.29. The length and width of a rectangle add up to 16 units, and the length is three times the width. What is the area of the rectangle?

Problem 1.30. What is the value of $\sqrt{5 \cdot 6 \cdot 10 \cdot 12}$?