Practice AMC 8

Pacific Trails Math League

Test Information and Rules:

- This is a 25 problem, 40-minute multiple choice exam.
- The questions are roughly in an order of difficulty.
- You MAY NOT use a calculator.
- The only aids allowed are: pencils/pens, white paper, graph paper, rulers, compasses, and protractors.

1. Tobey is buying office supplies. There are several deals offered:
    1) 25 cents/pencil
    2) $1.60/6 pencils
    3) 90 cents/3 pencils

    Tobey is looking for the best deal. Which one(s) should he buy?

    a. 1 b. 2 c. 3 d. 1 and 2 e. 2 and 3

2. Dean visits Mike's Mighty Meats to buy sausages and pork chops. Sausages are $5/pound and pork chops are $3.50/pound. If Dean buys two and a half pounds of sausages and 3 pounds of pork chops, what is his total cost?

    a. $8.50 b. $15.50 c. $20.50 d. $23.00 e. $23.75

3. When reading a book, Isabelle reads 4 more pages each day than the previous day. If she reads 23 pages on her first day, how many pages has she read by the end of her fourth day?

    a. 27 b. 92 c. 114 d. 116 e. 155

4. Geoff is driving home, but has forgotten the precise way. He simply knows he must take the next three turns, turning either right or left at each turn. If he randomly chooses which direction to go at each turn, what is the probability Geoff ends up at his house?

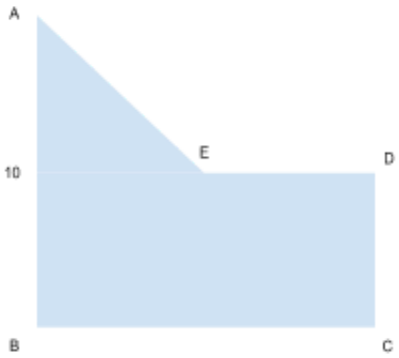
    a. ½ b. ¼ c. ⅛ d. ⅓ e. ⅔

5. An bicycle air pump will pump out 24 cubic inches of air each second. Meanwhile, an electric air pump will pump out 2 cubic feet of air each second. How many bicycle air pumps will I need to match the output of one electric air pump?

    a. 12 b. 24 c. 48 d. 64 e. 144

6. In the figure below, ABC are 3 points of a square, and AB is 10. If E is the center of that square and the line through E and D is perpendicular to AB, what is the area of the figure below?

   a. 60 b. 62.5 c. 63 d. 64 e. 75



7. Find the units digit of 9!

   a. 0 b. 2 c. 4 d. 6 e. 8

8. How many possible 3-digit numbers can be formed with distinct digits from 0 to 4?

   a. 46 b. 47 c. 48 d. 49 e. 50

9. At the farm, there are 2-legged chickens and 4-legged pigs in a pen. Sterling counts 21 total animal heads and 62 legs. How many chickens are there?

   a. 5 b. 8 c. 10 d. 11 e. 17

10. Garrett got a pet hamster on Friday, February 17, 2017. On what day of the week will his hamster be 703 days old?

    a. Monday b. Tuesday c. Wednesday d. Friday e. Sunday

11. Daniel walks leisurely to school at 5 ft/sec. Halfway there, he realizes that he forgot his math homework! He then fast walks back home at twice the speed, and from his home, he sprints to school at 3 times the speed. What is his average speed?

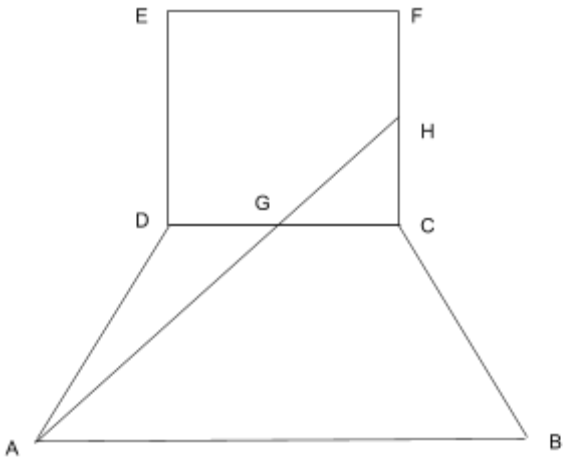
    a. 5 ft/sec b. $\frac{13}{2}$ ft/sec c. $\frac{15}{2}$ ft/sec d. 10 ft/sec e. $\frac{120}{13}$ ft/sec

12. The tennis team is organizing to take a picture, however, they must be organized a specific way. There are two coaches who must stand at either end. There are 2 boys and 3 girls who must stand between the coaches. How many possible line-ups are there?

a. 7 b. 12 c. 15 d. 18 e. 20

13. In the figure below, ABCD is an isosceles trapezoid, and CDEF is a square. A segment is drawn from point A to a point on CF, and the intersection point of the two lines is H. The intersection point between AH and CD is G. If angle GHF is 140 degrees and the angle ADC is 120 degrees, what is the sum of angles GAB + ABC?

a. 100 b. 110 c. 120 d. 130 e. 140



14. A conical cup is being filled with water. If it is filled to exactly half of its height, what fraction of its volume is water?

a. $\frac{1}{2}$ b. $\frac{1}{4}$ c. $\frac{1}{6}$ d. $\frac{1}{8}$ e. $\frac{1}{16}$

15. The mean, median, and unique mode of 2, 3, 5, 6, 6, 7, 10 and x are equal. What is x?

a. 4 b. 5 c. 7 d. 9 e. 11

16. The first k terms of a sequence sum to k^2. What is the 1000th term?

a. 1997 b. 1998 c. 1999 d. 2000 e. 2001

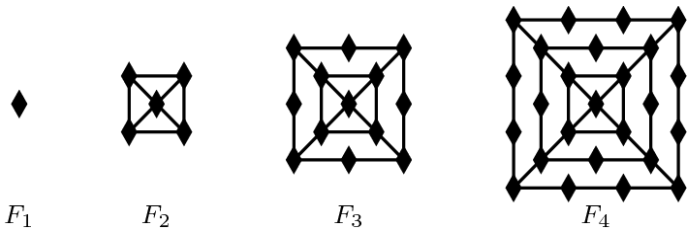
17. Jan lives 3 blocks west and 1 block south of the southwest corner of a park. Her workplace is 3 blocks east and 4 blocks north of the northeast corner of the park. To get to work each day, she bikes from her home to the southwest corner of the park, bikes diagonally through the park, and then she bikes from the northeast corner to her workplace. How many possible routes can she take?

a. 15 b. 38 c. 39 d. 105 e. 140

18. At *Greek Music,* a variety of CDs are sold. The store buys the *Alpha* track for $3 and sells it for $4.50. The *Beta* track is bought for $7.50 and is sold for $9.75. If *Greek Music* profited exactly 45 dollars yesterday and it sold at least 1 of each CD, how many different combinations of *Alpha* and *Beta* could the store have sold?

a. 8 b. 9 c. 10 d. 11 e. 12

19. The figures F_1, F_2, F_3, F_4 are shown. For $n \geq 3$, F_n is constructed from F_{n-1} by surrounding it with a square and placing one more diamond on each side of the new square. For example, F_3 has 13 diamonds. How many diamonds are in F_{20}?



a. 401 b. 485 c. 585 d. 626 e. 761

20. A circle with center (0, k) with $k < 8$ is tangent to the lines $y = x$, $y = -x$, and $y = 8$. What is the radius of this circle?

a. $4\sqrt{2}$ b. $8\sqrt{2} - 8$ c. $8 - 4\sqrt{2}$ d. $6\sqrt{2}$ e. $8\sqrt{2}$

21. What is the sum of all possible values of x in $3|x - 2| + |x - 5| = 17$?

a. 11/2 b. 7 c. 17/2 d. 9 e. 29/2

22. Janice and Yolanda run for 30 minutes on a circular track. Janice runs clockwise at 250 m/min and uses the inner lane with a radius of 50 meters. Yolanda runs counterclockwise at 300 m/min and uses the outer lane with a radius of 60 meters, starting on the same radial line as Janice. How many times after the start do they pass each other?

a. 44 b. 45 c. 46 d. 47 e. 48

23. Two trains are going the same direction on parallel tracks. Train 1 is 1 mile long, and train 2 is 3 miles long. The front of train 2 is 6 miles behind the front of train 1, and both trains are 24 minutes away from being side-to-side upon entering a tunnel. When the front of train 2 leaves the tunnel, train 1 has just fully entered the tunnel, and is side-to-side with the end of train 2. What is the sum of the speeds of train 1 and train 2, in miles per minute (MPM)?

a. 1/12 MPM b. 2/9 MPM c. 5/9 MPM d. 5/12 MPM
e. 1/3 MPM

24. Consider a set of 5 points, where no 3 points are collinear. If c is the number of circles that can be drawn through at least 3 points, what is the sum of all possible values of c?

a. 16 b. 17 c. 18 d. 19 e. 20

25. John and Craig take a morning coffee break each day. They arrive at the cafeteria independently, at random times between 10 am and 11 am, and stay for exactly m minutes. The probability that either one arrives while the other is in the cafeteria is 40%, and $m = a - b\sqrt{c}$, where a, b, and c are positive integers, and c is not divisible by the square of any prime. Find $a + b + c$.

a. 82 b. 83 c. 85 d. 86 e. 87