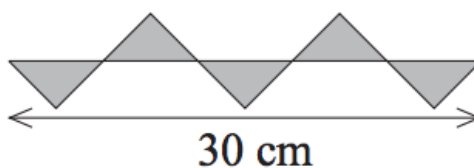


Week 5: Pre-AMC Level

Problem 1 The diagram shows five congruent right-angled isosceles triangles. What is the total area of the triangles? (British Math Competition)



- (A) $25cm^2$ (B) $30cm^2$ (C) $35cm^2$ (D) $45cm^2$ (E) $60cm^2$

Problem 2 The average of 9 numbers is 9. If one number is changed to 9, the average becomes 8. What is the original value of that number?(Hope Cup Math Competition, China)

- (A) 10 (B) 12 (C) 16 (D) 18 (E) 20

Problem 3 Which of the following fraction is in the midway between $\frac{1}{5}$ and $\frac{1}{3}$?

- (A) $\frac{1}{4}$ (B) $\frac{3}{10}$ (C) $\frac{4}{15}$ (D) $\frac{13}{60}$ (E) $\frac{17}{60}$

Problem 4 Greg sees a clock in the mirror, where it looks like this. What is the actual time? (Australian Math Competition)

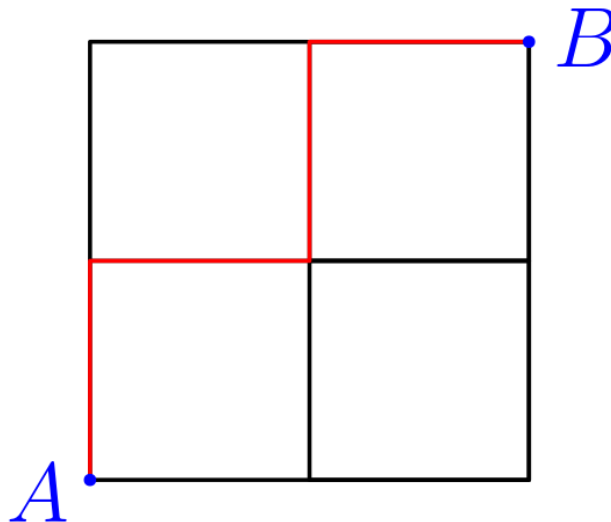


- (A) 4:10 (B) 4:50 (C) 5:10 (D) 6:50 (E) 7:10

Problem 5 N is the smallest positive integer whose digits add up to 50. What is the remainder when N is divided by 7?

- (A) 0 (B) 1 (C) 3 (D) 5 (E) 6

Problem 6 In the following 2×2 grid, what is the number of shortest paths to walk from the lower left corner A to the upper right corner B? For example, the red one is such a path.



- (A) 3 (B) 4 (C) 5 (D) 6 (E) 7

Problem 7 Positive integers are arranged in a way such that the n -th group has n consecutive numbers.

For example, the 1st group is 1;

the 2nd group is 2, 3;

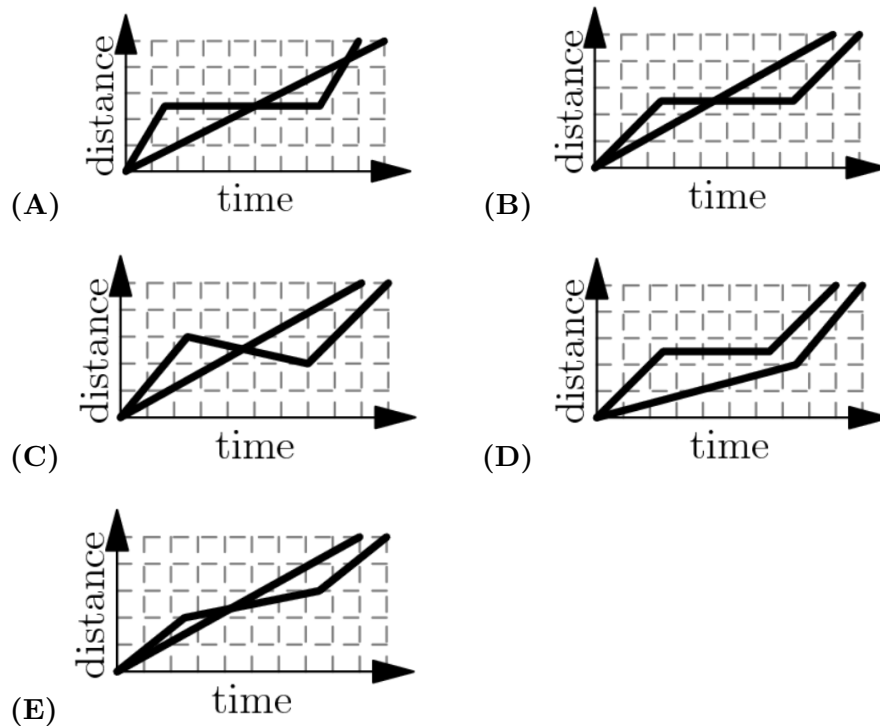
the 3rd group is 4, 5, 6;

...

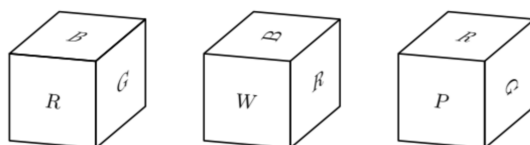
On which group is the number 100 in?

- (A) 11th (B) 12th (C) 13th (D) 14th (E) 15th

Problem 8 [AMC8 Problem] 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?

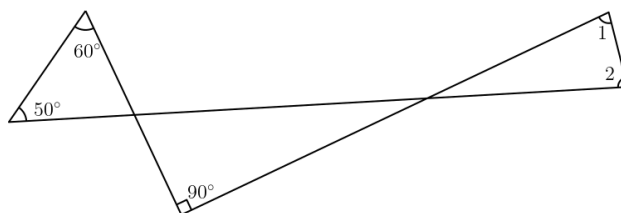


Problem 9 The faces of a cube are painted in six different colors: red (R), white (W), green (G), brown (B), aqua (A), and purple (P). Three views of the cube are shown below. What is the color of the face opposite the aqua face?



- (A) red (B) white (C) green (D) brown (E) purple

Problem 10 In the following picture, if $\angle 1 = \angle 2$, what is $\angle 1$?

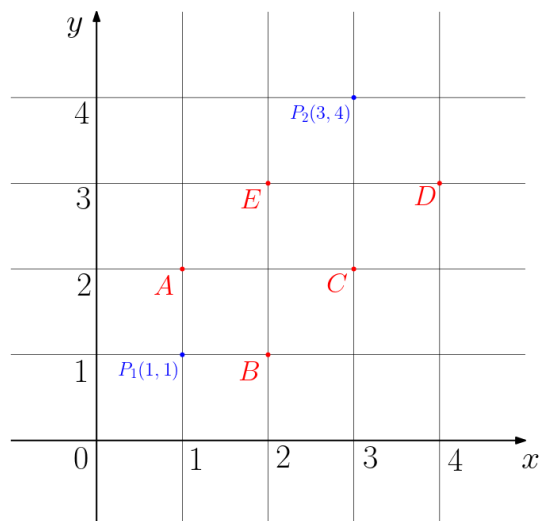


- (A) 60° (B) 65° (C) 70° (D) 75° (E) 80°

Problem 11 Jack, a zoo keeper, is going to give N peaches to a group of monkey. If he gives 10 peaches to each monkey, two monkeys will receive no peach. Or, the peaches are exactly enough to give 8 to each monkey. What is the sum of digits of N ?

- (A) 5 (B) 6 (C) 8 (D) 9 (E) 10

Problem 12 Every point on the plane can be assigned with a coordinate that has two numbers. For example, the coordinate of point P_1 in the following picture is $(1, 1)$ and the coordinate of point P_2 is $(3, 4)$. Which of the following points has the coordinate $(2, 3)$?



- (A) A (B) B (C) C (D) D (E) E

Problem 13 A pizza-shop offers a basic version of pizza with mozzarella and tomatoes. Two different toppings from the following list must be added: anchovies, artichokes, mushrooms, capers. Moreover, for each pizza three different sizes are available: small, medium, large. How many different types of pizza are available at all?

- (A) 11 (B) 12 (C) 15 (D) 18 (E) 36

Problem 14 Bag A : 1 Snickers bar + 1 Butterfinger bar.
 Bag B : 1 Butterfinger bar + 3 Reese's Peanut Butter Cups.
 Bag C : 1 Snickers bar + 2 Reese's Peanut Butter Cups.
 If each bag costs 50 cents, what is the price of
 1 Snickers bar+1 Butterfinger bar+1 Reese's Peanut Butter Cups,
 in cents ?

- (A) 40 (B) 45 (C) 50 (D) 55 (E) 60

Problem 15 For how many positive integer x ,

$$(x - 1)(x - 4)(x - 9)$$

is negative?

- (A) 2 (B) 3 (C) 4 (D) 5 (E) 6

Problem 16 A gumball machine contains 9 red, 7 white, and 8 blue gumballs. The least number of gumballs a person must buy to be sure of getting four gumballs of the same color is

- (A) 8 (B) 9 (C) 10 (D) 12 (E) 18

Problem 17 For how many 4-digit numbers $\overline{1a2b}$ like are divisible by 15?

Note that a number is divisible by 15 if and only if it is divisible by both 3 and 5.

- (A) 3 (B) 4 (C) 6 (D) 7 (E) 8

Problem 18 Emily took selfies with her 8 cousins. Each of the 8 cousins is in two or three pictures. In each picture there are exactly 5 cousins. How many selfies did Emily take? (Australian Math Kangaroo Competition)

- (A) 3 (B) 4 (C) 5 (D) 6 (E) 7

Problem 19 How many pairs of positive integers (x, y) satisfying that $3x + 4y = 120$?

- (A) 9 (B) 15 (C) 20 (D) 24 (E) 30

Problem 20 The integers $1, 2, 3, \dots, 20$ are written on the board. What is the smallest number of these integers that can be wiped off so that the product of the remaining integers ends in 2?

- (A) 5 (B) 6 (C) 7 (D) 8 (E) 9

Answers

1. D (Hint: Four congruent isosceles right triangles can form a square.)
2. D 3. C 4. E 5. B 6. D 7. D 8. B 9. A
10. E (Hint: The sum of three angles of a triangle is 180° .)
11. C (Hint: You may let x be the number of monkeys and then set up an equation based on the number of peaches.)
12. E
13. D (Hint: Use multiplication principle.)
14. E 15. C
16. C (Hint: What is the maximum number of gumballs he could buy if there is no four gumballs of the same color?)
17. D (Hint: A number is divisible by 15 if and only if it is divisible by both 3 and 5. Recall divisibility tests for 3 and 5.)
18. B (Hint: If every cousin is in two or three pictures, can you give an estimate about the total number of people on all pictures?)
19. A 20. A