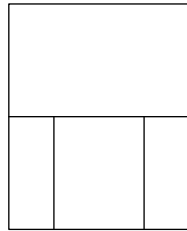


- Find $2 \times (2 + 3)$
 (A) 8 (B) 9 (C) 10 (D) 11 (E) 30
- On Monday, Lyndon receives a 80 on his daily math quiz. After being scolded by his parents, he works harder and gets an 83 on Tuesday. From Tuesday onward, his score improves by 3 points each day. What will be Lyndon's score that Friday?
 (A) 89 (B) 92 (C) 95 (D) 98 (E) 100
- Given that $2x + 5 - 3x + 7 = 8$, what is the value of x ?
 (A) -4 (B) -2 (C) 0 (D) 2 (E) 4
- Allen flips a fair two sided coin and rolls a fair 6 sided die with faces numbered 1 through 6. What is the probability that the coin lands on heads and he rolls a number that is a multiple of 5?
 (A) $\frac{1}{24}$ (B) $\frac{1}{12}$ (C) $\frac{1}{6}$ (D) $\frac{1}{4}$ (E) $\frac{1}{3}$
- How many distinct prime factors does the number 36 have?
 (A) 2 (B) 4 (C) 6 (D) 9 (E) 15
- How many rectangles are in the following figure?



- (A) 5 (B) 6 (C) 7 (D) 8 (E) 9
- In one peculiar family, the mother and the three children have exactly the same birthday. Currently, the mother is 37 years old while each of children are 9 years old. How old will the mother be when the sum of the ages of the three children equals her age?
 (A) 14 (B) 27 (C) 42 (D) 57 (E) 66
- James randomly selects 4 distinct numbers between 3 and 10, inclusive. What is the probability that all 4 numbers are prime?
 (A) 0 (B) $\frac{1}{28}$ (C) $\frac{1}{14}$ (D) $\frac{1}{7}$ (E) $\frac{1}{4}$
- Betsy is addicted to chocolate. Every day, she eats 2 chocolates at breakfast, 3 chocolates at lunch, 1 chocolate during her afternoon snack time, and 5 chocolates at dinner. If she begins eating a bag of 100 chocolates at breakfast one day, during which meal will she eat the last piece in the bag?
 (A) breakfast (B) lunch (C) snack time (D) dinner (E) impossible to determine
- John defines the function $f(x) = (x - 3)(x - 9) + 8$. What the value of $f(3)$?
 (A) 0 (B) 3 (C) 8 (D) 9 (E) 12

11. An integer N which satisfies exactly three of the four following conditions is called *two-good*.

- (I) N is divisible by 2
- (II) N is divisible by 4
- (III) N is divisible by 8
- (IV) N is divisible by 16

How many integers between 1 and 100, inclusive, are *two-good*?

- (A) 6 (B) 7 (C) 8 (D) 9 (E) 10

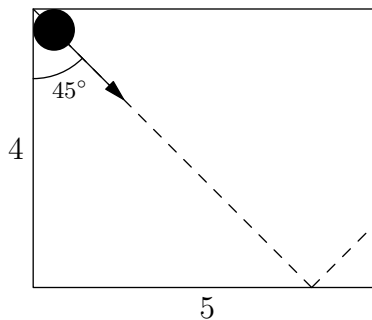
12. Calculate the product $\frac{1}{3} \times \frac{2}{4} \times \frac{3}{5} \times \cdots \times \frac{18}{20} \times \frac{19}{21}$.

- (A) $\frac{1}{210}$ (B) $\frac{1}{190}$ (C) $\frac{1}{21}$ (D) $\frac{1}{20}$ (E) $\frac{1}{10}$

13. What is the remainder when the sum $1 + 10 + 19 + 28 + \cdots + 91$ is divided by 9?

- (A) 0 (B) 2 (C) 3 (D) 4 (E) 8

14. A cue ball is shot at a 45 degree angle from the upper right corner of a billiard table with dimensions 4 ft by 5 ft, as shown. How many times does the ball bounce before hitting another corner? Assume that when the ball bounces, its path is perfectly reflected. The final impact in the corner does not count as a bounce.



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

15. Alice, Bob, and Catherine decide to have a race. Alice runs at a speed of 3 feet per second, and Bob runs at a speed of 5 feet per second. In the end, Bob finishes the same amount of time before Catherine as Catherine finishes before Alice. What was Catherine's speed, in feet per second?

- (A) $\frac{15}{4}$ (B) 4 (C) $\frac{17}{4}$ (D) $\frac{9}{2}$ (E) impossible to determine

16. For some constant b , the graph of $y = x^2 + b^2 + 2bx - b + 2$ has only one x intercept. What is the value of b ?

- (A) 1 (B) 2 (C) 4 (D) 8 (E) 10

17. Jason has 5 pairs of socks, and each pair is a different color. He randomly selects 3 socks. What is the probability two of the three socks form a pair (i.e. two are the same color)?

- (A) $\frac{1}{12}$ (B) $\frac{1}{6}$ (C) $\frac{1}{3}$ (D) $\frac{1}{2}$ (E) $\frac{2}{3}$

18. A class of 10 children is divided into 5 pairs of partners. Each pair of partners sits next to each other and works together during class. One day, the teacher decides he wants to divide the class into two groups. In order to make sure the students work with new people, he makes sure not to put any student in the same group as his or her partner. How many different ways can he divide the class into these two groups?

- (A) 2 (B) 5 (C) 10 (D) 16 (E) 32

19. Let $S(n)$ denote the sum of digits of an integer n (For example, $S(17) = 1 + 7 = 8$). If a positive two digit integer is randomly selected, what is the probability $S(S(n)) \geq 8$?

- (A) 0 (B) $\frac{1}{9}$ (C) $\frac{2}{9}$ (D) $\frac{11}{45}$ (E) $\frac{13}{45}$

20. Given that two real numbers x and y satisfy $x^2 - 6xy + 9y^2 + |x - 3| = 0$, calculate $x + y$.

- (A) 1 (B) 3 (C) 4 (D) 16 (E) impossible to determine

21. The first 32 perfect squares, $1, 4, 9, 16, 25, \dots, 961, 1024$ are combined together into one large number by appending their digits in succession, forming the number $N = 1491625 \dots 9611024$. How many digits does N have?

- (A) 84 (B) 85 (C) 86 (D) 87 (E) 88

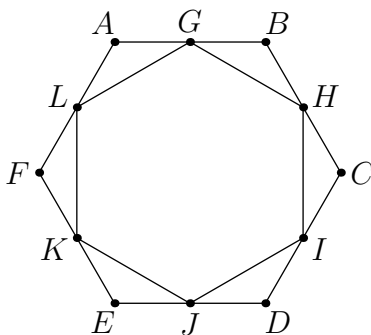
22. Scientists perform an experiment on a colony of bacteria with an initial population of 32. The scientists expose the bacteria to alternating rounds of light and darkness. They first put the bacteria in a bright environment for one hour before placing it in a dark room for the second hour, and then repeating this process. Because they are vulnerable to light, the population of the bacteria will be halved in one hour of exposure to sunlight. However, in one hour of darkness, the population triples. How many hours will it take for the bacteria's population to exceed 150?

- (A) between 4 and 5 (B) between 5 and 6 (C) between 6 and 7 (D) between 7 and 8 (E) between 8 and 9

23. How many ordered pairs of integers (x, y) satisfy $xy - 6y - 4x + 20 = 0$?

- (A) 1 (B) 2 (C) 3 (D) 4 (E) 6

24. Regular hexagon $ABCDEF$ has area 1. Starting with edge AB and moving clockwise, a new point is drawn exactly one half of the way along each side of the hexagon. For example, on side AB , the new point, G , is drawn so $AG = \frac{1}{2}AB$. This forms hexagon $GHIJKL$, as shown. What is the area of this new hexagon?



- (A) $\frac{3}{5}$ (B) $\frac{5}{7}$ (C) $\frac{3}{4}$ (D) $\frac{7}{9}$ (E) $\frac{4}{5}$

25. Each day John's mother sends him to the store with \$1 to buy widgets and gadgets, each of which cost a whole number of cents. On the first day John comes back with 4 widgets, 5 gadgets, and 35 cents in change. On the second day, John comes back with 5 widgets, 4 gadgets, and 39 cents in change. On the third day, John comes back with only c cents in change. He hands his mother the change, telling her that he had tripped coming home and broken all the widgets and gadgets. His mother, thinking for a moment, begins yelling at him for lying, as she noticed that there was no way he could have received exactly c cents in change given the price of widgets and gadgets. What is the sum of the digits of the least possible value of c ?

- (A) 10 (B) 13 (C) 15 (D) 18 (E) impossible to determine

Answer key

1. C
2. B
3. E
4. B
5. A
6. D
7. C
8. A
9. A
10. C
11. A
12. A
13. B
14. E
15. A
16. B
17. C
18. D
19. C
20. C
21. B
22. D
23. E
24. C
25. C