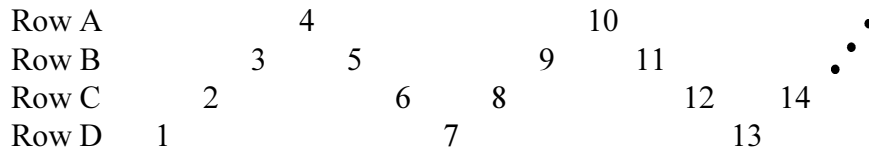


1. The positive integers are written consecutively in the pattern below. What integer will be the eighth entry in Row A? 1. \_\_\_\_\_



2. How many full seven-day weeks are there in seven consecutive years? Assume the first day of the first year is the first day of the week. 2. \_\_\_\_\_

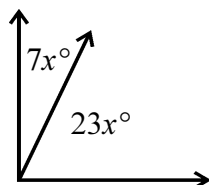
3. What perfect-square integer is closest to 273? 3. \_\_\_\_\_

4. Three hundred students took a test and all three hundred test scores are shown in the table below. What is the least possible integral score a student could earn and still have a higher score than 75 percent of the students taking the test? 4. \_\_\_\_\_

|           |   |   |    |    |    |    |    |    |    |    |    |    |    |
|-----------|---|---|----|----|----|----|----|----|----|----|----|----|----|
| Score     | 0 | 1 | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 |
| #Students | 3 | 6 | 12 | 13 | 16 | 23 | 28 | 43 | 51 | 45 | 37 | 16 | 7  |

5. In the arithmetic sequence 17,  $a$ ,  $b$ ,  $c$ , 41, what is the value of  $b$ ? 5. \_\_\_\_\_

6. Two complementary angles, A and B, have measures in the ratio of 7 to 23, respectively. What is the ratio of the measure of the complement of angle A to the measure of the complement of angle B? Express your answer as a common fraction. 6. \_\_\_\_\_



7. Rich invested \$100 seven years ago. Since then his investment has doubled in value to \$200. If Rich's money continues to double every seven years, how many years will it take his \$200 to grow to \$1600?



7. \_\_\_\_\_

8. What is the slope of a line parallel to  $2x + 4y = -17$ ? Express your answer as a common fraction.

8. \_\_\_\_\_

9. How many distinct positive integers can be represented as the difference of two numbers in the set  $\{1, 3, 5, 7, 9, 11, 13\}$ ?

9. \_\_\_\_\_

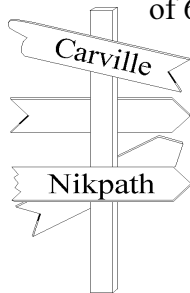
10. Points P and R are located at  $(1, 3)$  and  $(7, 15)$  respectively. Point M is the midpoint of segment PR. Segment PR is reflected over the  $x$ -axis. What is the sum of the coordinates of the image of point M (the midpoint of the reflected segment)?

10. \_\_\_\_\_

11. In a three-digit number, the hundreds digit is greater than 5, the tens digit is greater than 4 but less than 8, and the units digit is the smallest prime number. How many three-digit numbers satisfy all of these conditions?

11. \_\_\_\_\_

12. The trip from Carville to Nikpath requires  $4\frac{1}{2}$  hours when traveling at an average speed of 70 miles per hour. How many hours does the trip require when traveling at an average speed of 60 miles per hour? Express your answer as a decimal to the nearest hundredth.



12. \_\_\_\_\_

13. Points  $A(0, 0)$ ,  $B(6, 0)$ ,  $C(6, 10)$  and  $D(0, 10)$  are vertices of rectangle  $ABCD$ , and  $E$  is on segment  $CD$  at  $(2, 10)$ . What is the ratio of the area of triangle  $ADE$  to the area of quadrilateral  $ABCE$ ? Express your answer as a common fraction.

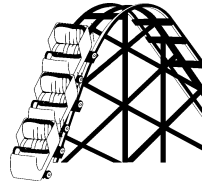
13. \_\_\_\_\_

14. Each of the four digits 2, 4, 6 and 9 is placed in one of the boxes to form a fraction as shown below. The numerator and the denominator are both two-digit whole numbers. What is the smallest value of all the common fractions that can be formed? Express your answer as a common fraction.

14. \_\_\_\_\_

$$\frac{\square\square}{\square\square}$$

15. At 10:00 a.m., Boon Tee is the 225<sup>th</sup> person in line to ride the Rocker Roller Coaster. Each roller coaster train holds 36 people. A full train leaves every four minutes. If the first 36 people in line leave on the 10:01 train, what time will Boon Tee's train leave?



15. \_\_\_\_\_

16. The triangle with vertices  $A(6, 1)$ ,  $B(4, 1)$  and  $C(4, 4)$  is rotated 90 degrees counterclockwise about  $B$ . What are the coordinates of the image of  $C$  (the point where  $C$  is located after the rotation)? Express your answer as an ordered pair.

16. (   ,   )

17. A *palindrome* is a number which reads the same forward as backward. For example, 343 and 1221 are palindromes. What is the least natural number that can be added to 40,305 to create a palindrome?

17. \_\_\_\_\_

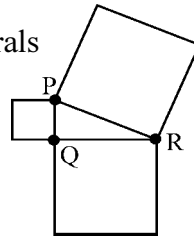
18. Define  $A @ B$  to be  $\frac{A}{B} + A \times B$ . What is the value of  $20 @ (4 @ 2)$ ?

18. \_\_\_\_\_

19. The numbers on a standard six-faced die are arranged such that numbers on opposite faces always add to seven. The product of the numbers appearing on the four lateral faces of a rolled die is calculated (ignoring the numbers on the top and bottom). What is the maximum possible value of this product?

19. \_\_\_\_\_

20. Angle PQR is a right angle. The three quadrilaterals shown are squares. The sum of the areas of the three squares is 338 square centimeters. What is the number of square centimeters in the area of the largest square?



20. \_\_\_\_\_

21. Container I holds 8 red balls and 4 green balls; containers II and III each hold 2 red balls and 4 green balls. A container is selected at random and then a ball is randomly selected from that container. What is the probability that the ball selected is green? Express your answer as a common fraction.

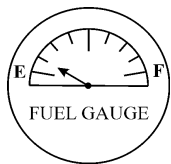
21. \_\_\_\_\_

22. The arithmetic mean of nine numbers is 54. If two numbers  $u$  and  $v$  are added to the list, the mean of the eleven-member list becomes 66. What is the mean of  $u$  and  $v$ ?

22. \_\_\_\_\_

23. The gasoline gauge on a van initially read  $\frac{1}{8}$  full. When 15 gallons of gasoline were added to the tank, the gauge then read  $\frac{3}{4}$  full. How many more gallons would be needed to fill the tank?

23. \_\_\_\_\_



24. Three fair, standard six-faced dice of different colors are rolled. In how many ways can the dice be rolled such that the sum of the numbers rolled is 10?

24. \_\_\_\_\_

25. In the counting game Bing-Bong, Arlene starts counting at 1, but skips all multiples of 3 and all numbers that contain the digit "3". For example, Arlene counts: 1, 2, 4, 5, 7, 8, 10, 11, 14, 16,.... What is the 40<sup>th</sup> number in this sequence? 25. \_\_\_\_\_

26. For a certain natural number  $n$ ,  $n^2$  gives a remainder of 4 when divided by 5, and  $n^3$  gives a remainder of 2 when divided by 5. What remainder does  $n$  give when divided by 5? 26. \_\_\_\_\_

27. Suppose  $\frac{x}{y} = \frac{4}{7}$  and  $\frac{y}{z} = \frac{14}{3}$ . What is the value of  $\frac{x+y}{z}$ ? Express your answer as a common fraction. 27. \_\_\_\_\_

28. Two different numbers are randomly selected from the set  $S = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11\}$ . The probability that their sum is 12 would be greater if the number  $n$  had first been removed from set  $S$ . What is the value of  $n$ ? 28. \_\_\_\_\_

29. Tomas enters a classroom at exactly 9:00 a.m. and notices that the 12-hour analog clock on the wall is behaving very strangely. The clock reads 4:20 and the second hand is racing very fast. In fact, the second hand makes one complete circle every 4 seconds. The minute hand and hour hand continue to behave as if every full rotation of the second hand indicates that a minute has passed. When Tomas leaves the class at 9:50 a.m., what time will the clock on the wall read? 29. \_\_\_\_\_



30. If  $x + \frac{1}{x} = 4$ , then what is the value of  $x^3 + \frac{1}{x^3}$ ? 30. \_\_\_\_\_