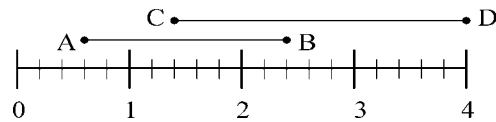


1. The marks on this number line are evenly spaced. How many units longer is segment CD than segment AB? Express your answer as a decimal to the nearest tenth.



1. \_\_\_\_\_

2. The sum of the first  $n$  positive integers is 28. What is the value of  $n$ ?

2. \_\_\_\_\_

3. The temperature at 5:00 am at IMAFREEZIN was  $-28^{\circ}\text{F}$ . The temperature at 2:00 pm was  $17^{\circ}\text{F}$ . What was the average temperature increase in degrees Fahrenheit per hour from 5:00 am to 2:00 pm?

3. \_\_\_\_\_

4. Running at a speed of 8 miles per hour, how many minutes will it take Edwina to run 14 miles?

4. \_\_\_\_\_

5. What is the number of square inches in the area of a rectangle having dimensions  $1\frac{1}{2}$  yards by  $1\frac{1}{2}$  feet?

5. \_\_\_\_\_

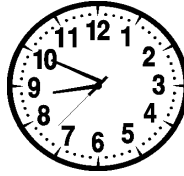
6. The number  $n$  is randomly selected from the set  $\{1, 2, \dots, 10\}$ , with each number being equally likely. What is the probability that  $2n - 4 > n$ ? Express your answer as a common fraction.

6. \_\_\_\_\_

7. Exactly forty-eight non-overlapping square tiles, each 1 inch by 1 inch, fit within a rectangle. What is the least possible number of inches in the perimeter of the rectangle?

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

8. Angela's school day consists of: four 45-minute periods; one 90-minute period; one 25-minute lunch period; and five 4-minute breaks. Her school day starts at 8:50 am. What time in the afternoon does it end?



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

9. A circular pizza with a radius of 6 inches is cut along radii into three wedge-shaped slices. The measures of two of the central angles are 80 degrees and 130 degrees. What is the number of square inches in the area of the largest slice? Express your answer in terms of  $\pi$ .

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

10. What is the units digit of  $1! + 3! + 5! + 7! + 9! + 11!$ ?

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

11. If  $f(x) = 5x^2 + 3x + 4$ , what is the value of  $f(-2)$ ?

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

12. The Newport Crab Company marks the location of its crab pots with colored balloons. They mark every fourth pot with a red balloon, every sixth pot with a blue balloon, and every tenth pot with a yellow balloon. After placing 600 crab pots in the bay, how many pots have three different colored balloons attached?

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

13. Two standard 6-sided dice are tossed. What is the probability that the sum of the numbers shown on the dice is a prime number? Express your answer as a common fraction.

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

14. Every student in the senior class is taking history or science and 85 of them are taking both. If there are 106 seniors taking history and 109 seniors taking science, how many students are in the senior class?

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

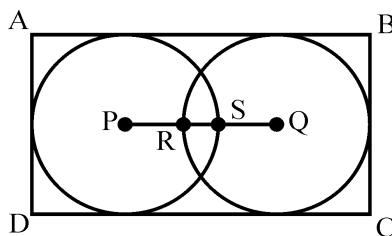
15. The sum of three numbers  $a$ ,  $b$  and  $c$  is 88. If we decrease  $a$  by 5, we get  $N$ . If we increase  $b$  by 5, we get  $N$ . If we multiply  $c$  by 5, we get  $N$ . What is the value of  $N$ ?

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

16. Suppose that 6% of the eighth graders and 3% of the seventh graders at Washington Junior High participate in MATHCOUNTS. There are 1.5 times as many 8th graders as 7th graders at the school. What percentage of the 7th and 8th graders, taken together, participates in MATHCOUNTS? Express your answer to the nearest tenth.

16. \_\_\_\_\_

17. Each of the circles  $P$  and  $Q$  is tangent to rectangle  $ABCD$  at three points, as shown. Each circle has a radius of 6 cm.  $RS = 2$  cm. What is the number of square centimeters in the area of rectangle  $ABCD$ ?



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

18. How many nine-digit numbers can be made using each of the digits 1 through 9 exactly once with the digits alternating between odd and even?

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

19. In any month with five Mondays, a school declares the fifth Monday a Marvelous Monday. School begins on Monday, September 4. What is the date of the first Marvelous Monday after school starts? 19. \_\_\_\_\_

20. The whole numbers are written consecutively in the pattern below. In which row (A, B, C, D or E) will the number 500 be written? 20. \_\_\_\_\_

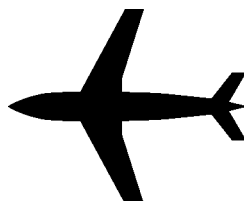
Row A:	5	6	7	17	18	19
Row B:	4		8	16		•
Row C:	3		9	15		•
Row D:	2		10	14		•
Row E:	1		11	12	13	

21. What is the smallest three-digit number that is a multiple of 4 and whose digits' sum is 23? 21. \_\_\_\_\_

22. If  $a * b = b\sqrt{a^b}$ , what is the value of  $2 * (3 * 2)$ ? 22. \_\_\_\_\_

23. Alexio has 100 cards numbered 1-100, inclusive, and places them in a box. Alexio then chooses a card from the box at random. What is the probability that the number on the card he chooses is a multiple of 2, 3 or 5? Express your answer as a common fraction. 23. \_\_\_\_\_

24. A jet airplane departing on time, flying between two airports at an average speed of 540 mph arrives eight minutes late. Departing on time and flying at an average speed of 480 mph it arrives fifty-three minutes late. What is the number of miles between the two airports? 24. \_\_\_\_\_



25. What is the positive value of  $m$  such that the triangle bounded by the lines  $y = 0$ ,  $x = 12$  and  $y = mx$  has an area of 1872 square units? 25. \_\_\_\_\_

26. What is the remainder when  $2^{87} + 3$  is divided by 7? 26. \_\_\_\_\_

27. In triangle ABC, angle B is a right angle. Points P and Q are on side BC, with P between B and Q, so that segments AP and AQ trisect angle BAC. The measure of angle APC is  $114^\circ$ . What is the number of degrees in the measure of angle ACB? 27. \_\_\_\_\_

28. A line segment drawn from a vertex of a unit square to a point on the square forms two regions. The area of the smaller region is one-third of the area of the larger region. How many units are in the length of that segment? Express your answer as a common fraction in simplest radical form. 28. \_\_\_\_\_

29. A vendor has six jugs of punch with capacities of 13, 15, 16, 21, 21 and 22 gallons. One jug, which he keeps for himself, is full of blue punch. The other five jugs are full of red punch. Without opening any of the jugs, he sells  $\frac{1}{3}$  of the red punch to Randy and the remaining  $\frac{2}{3}$  of the red punch to Lisa. How many gallons of the blue punch did he keep for himself? 29. \_\_\_\_\_



30. The mean of six positive integers is 5, and the median is 6. What is the largest the mode could be, given that the mode is unique? 30. \_\_\_\_\_