

AMTNJ Mathematics Contest of New Jersey - 2019

Middle School Students

Non-Calculator Section (25 minutes)

1. The NJ Middle School secretary needs to buy pens, calendars, and journals for a meeting. Pens come in packages of 20, calendars come in packages of 6, and journals come in packages of 12. The secretary wants to have the same number of pens, calendars, and journals. How many packages of each item does he need to buy?

2. Erin walked the same distance each day for 8 days. On the 9th day, she walked $1\frac{1}{4}$ miles. How many miles did she walk each day during the first eight days, if she walked $6\frac{1}{20}$ miles in total during the nine days.

3. Steve reads 20 pages in 50 minutes. At this rate, how long will it take him to read 50 pages?

A. 20 minutes

B. 1 hour 45 minutes

C. 1 hour 20 minutes

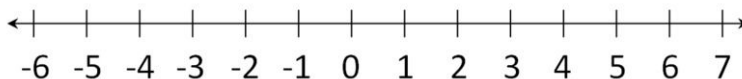
D. 2 hours 5 minutes

4. Find the value of w that makes the statement below true.

$$-2.7w + 0.4 = 2.8 - 1.2w$$

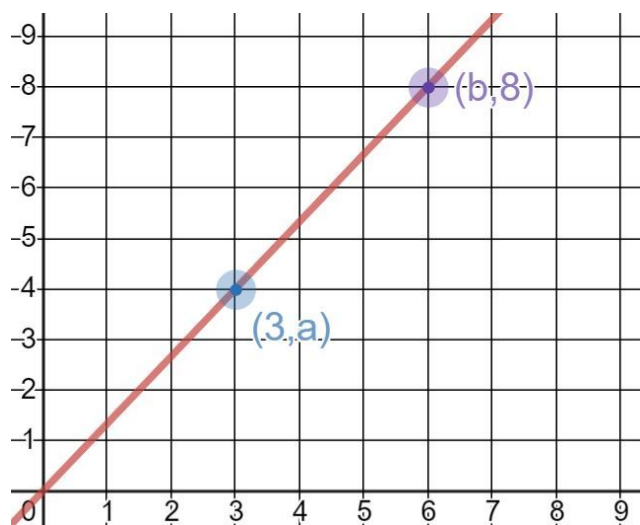
5. Solve the inequality using the properties of inequalities and graph the final solution set on the number line provided.

$$6 - 4x > 18$$



6. The sum of 3 less than 5 times a number and the number increased by 9 is 24. What is the number?

7. The table represents the same relationship between x and y as the graph. Fill in the missing values in the table.



x	0	3	6	9
y	0			

8. Write the slope-intercept form of the equation of the line through: $(4, -1)$ and $(0, -3)$.

9. If you flip three fair coins, what is the probability that the first two flips will both be heads, and the third flip will be either heads or tails?

A. $\frac{1}{4}$

B. $\frac{1}{2}$

C. 1

D. $\frac{1}{8}$

10. Determine the following: $[1 + 2 \div 3 \times 4] \times [9 \times (8 - 7) \div (6 + 5)]$

11. In eighth grade, the ratio of boys to girls was 5:4. After 3 more girls enrolled in the eighth grade, the ratio was 10:9. How many students are in the eighth grade now?

A. 57

B. 109

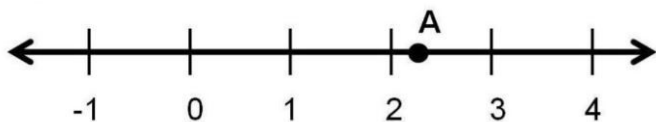
C. 54

D. 22

12. If $a + b = 18$ and $a - b = 4$, what is the value of $2a - 3b$

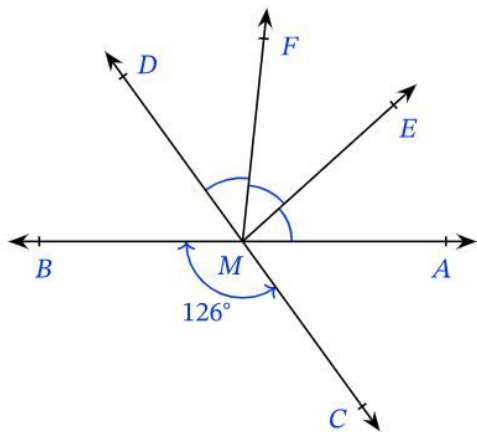
- A. 0
- B. 5
- C. 1
- D. 3

13. Which of the following numbers could the point labeled A represent on the number line shown?



- A. $\sqrt{4}$
- B. $\frac{11}{3}$
- C. $\frac{7}{3}$
- D. $\sqrt{3}$

14. Calculate $m\angle CMF$.



Calculator Section (20 minutes)

15. Michael, Rami, and Andres share a sum of money. Michael has 45% more money than Rami. Rami has 40% more money than Andres. If Andres has \$75, how much do the three friends have altogether?

16. Mr. Escalante has created a Fibonacci-like sequence for his students.

4, 5, 9, 14, 23, 37, ...

What number will be the 8th term of the sequence?

17. An empty container is being filled with water at the rate of 5 liters every 45 seconds and leaks water at the rate of one liter every 180 seconds. What is the quantity of water in the container after one hour?

A. 400 liters

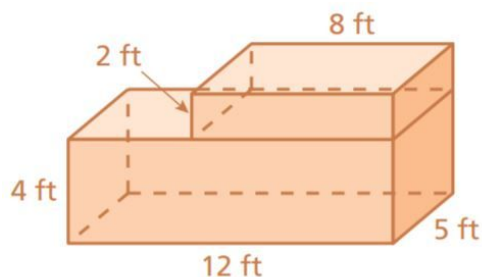
B. 380 liters

C. 100 liters

D. 500 liters

18. Max has the following test grades: 85, 83, 99, and 95. If Max wants to ensure that his test average grade is at least 90%, what is the minimum score on the 5th test he has to receive?

19. Find the surface area of the shape below. Round your answer to the nearest tenth.



A. 308 sq feet

B. 248 sq feet

C. 288 sq feet

D. 340 sq feet

20. Diana and Latisha play basketball. During one month, Diana made 13 foul shots out of 25 attempted. Latisha made 11 foul shots out of 20 attempted. Who had the better foul-shooting percentage and what is it.

21. A company usually sends 9 people to install a security system in an office building, and they do it in about 96 minutes. Today, they have only three people to do the same size job. How much time should be scheduled to complete the job?

- A.** 32 minutes
- B.** 288 minutes
- C.** 10 hours
- D.** 1 hour 30 minutes

22. A rectangle has a width of 15 inches and a diagonal of 17 inches. Find the length of the rectangle in inches.

- A.** 2 in
- B.** 8 in
- C.** 64 in
- D.** 16 in

23. The angles of a triangle are in the ratio 1:3:8. What is the measure of the largest angle?

- A.** 130°
- B.** 15°
- C.** 150°
- D.** 120°

24. In a certain country last year a total of 500 million tons of trash was recycled. The chart below shows the distribution, in millions of tons, for the different types of trashes. What percent of the recycled trash was aluminum?

- A.** 53%
- B.** 24%
- C.** 90%
- D.** 18%

