

Kansas City Area Teachers of Mathematics  
2018 KCATM Math Competition

**NUMBER SENSE  
GRADE 7**

**NO CALCULATOR**

**INSTRUCTIONS**

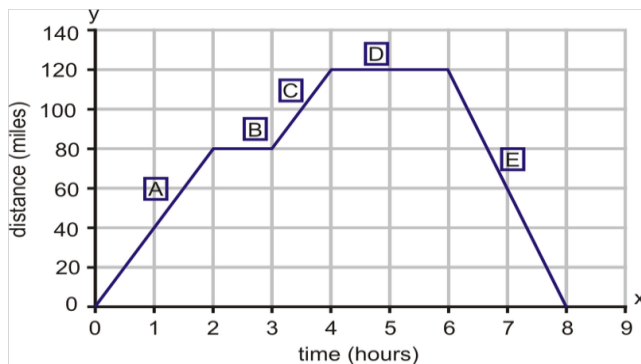
- **Do not open this booklet** until instructed to do so.
- Time limit: **20 minutes**
- You **may NOT use calculators**.
- Mark your answer on the Scantron sheet by **FILLING in the oval**.
- You **may not use rulers, protractors, or other measurement devices** on this test.
- With circles, **exact answers** will be given in terms of  $\pi$ .

Student Name \_\_\_\_\_ Student Number \_\_\_\_\_

School \_\_\_\_\_

1. You have 6.75 lbs of flour. If a recipe that makes 18 cookies calls for  $\frac{3}{4}$  lbs of flour, how many dozens of cookies can you make?  
A. 7.5                      B. 13.5                      C. 14                      D. 162                      E. None of the above
2. What is the sum of the first 80 natural numbers ( $1 + 2 + 3 + \dots + 78 + 79 + 80$ )?  
A. 243                      B. 3160                      C. 3240                      D. 4000                      E. None of the above
3. What is the greatest common factor of 36, 90, and 117?  
A. 1                      B. 3                      C. 6                      D. 18                      E. None of the above
4. At 11 years old, Samantha's height in inches is 14 less than 3 times as tall as she was at 2 years old. Which equation represents this? ( $s$  = current height,  $h$  = height at age 2)  
A.  $s = 14 - 3h$       B.  $11s = 2h$       C.  $h = 14 - 3s$       D.  $s = 3h - 14$                       E. None of the above
5. Fifteen percent of kids at a particular school are involved in track. If there are 900 students at the school, how many do not participate in track?  
A. 135                      B. 150                      C. 775                      D. 885                      E. None of the above
6. The local electronics store was closing out the previous year's phones by marking them down from \$700 to \$420. You had a coupon to take 40% off the sales price. By what percent was the original price reduced after your coupon?  
A. 80%                      B. 40%                      C. 36%                      D. 64%                      E. None of the above
7. What is the solution to the following?  $\frac{3}{4} + 2\frac{1}{6}\left(3 - \frac{9}{4}\right) - 2\frac{1}{3}$   
A.  $\frac{1}{24}$                       B.  $-\frac{7}{48}$                       C.  $-\frac{1}{24}$                       D.  $\frac{7}{48}$                       E. None of the above
8. What is the greatest common factor of  $6^3$  and 1050?  
A. 1                      B. 3                      C. 6                      D. 9                      E. None of the above

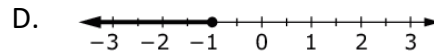
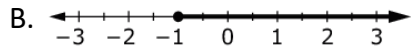
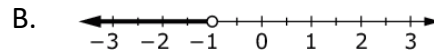
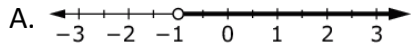
9. A taxi charges \$3.45 per segment + \$.25 per  $\frac{1}{8}$  mile of the trip. If you need to get a ride to and from school which is 3.25 miles away, how much does the trip cost?
- A. \$3.70      B. \$7.40      C. \$9.95      D. \$19.90      E. None of the above
10. At Harkins' Hardware Hut, you can purchase light bulbs in 6 packs or 8 packs. A six pack of bulbs costs \$7.14 and an eight pack costs \$10.16. Assuming you want the better bargain, which pack do you buy and how much do you save per bulb?
- A. Eight pack – 8¢ per bulb      B. Eight pack – 1.19¢ per bulb  
C. Six pack – 8¢ per bulb      D. Six pack – 1.19¢ per bulb  
E. None of the above
11. The perfect pizza has seven pepperonis for every two slices of mushrooms on the pizza. Which of the following equations represents the relationship between mushrooms ( $m$ ) and pepperonis ( $p$ )?
- A.  $p + 7 = m + 2$       B.  $\frac{p}{m} = \frac{2}{7}$       C.  $7p - 2m = 0$       D.  $p + m = 9$   
E. None of the above
12. The following graph shows the distance from your house during a family road trip. How many miles did your family travel on this trip?



- A. 0 miles  
B. 120 miles  
C. 240 miles  
D. 400 miles  
E. None of the above

13. What is the value of:  $\left[-\frac{26}{6} + \left(3\frac{1}{3}\right)\right](-6)$
- A. -32      B. -6      C. 0      D. 6      E. None of the above
14. Riding on your bike, you are able to travel 8.4 km in 50 minutes. What is your speed in km per minute rounded to the nearest tenth?
- A. 5.95 km/min      B. 6.0 km/min      C. 0.17 km/min      D. 0.2 km/min  
E. None of the above

15. What is the solution to the inequality:  $-12x + 8 \geq -4$



E. None of the above

16. What is the multiplicative inverse of a number  $n$ ?

- A.  $-n$       B. 0      C.  $\frac{1}{n}$       D.  $-\frac{1}{n}$       E. None of the above

17. What is the additive inverse of  $\frac{1}{7}$ ?

- A.  $-7$       B.  $-\frac{1}{7}$       C.  $\frac{1}{7}$       D.  $\frac{6}{7}$       E. None of the above

18. A country has a population of 100,000. The next year the population decreases by 20% in one year. The following year it increases by 20%. What is the resulting population?

- A. 96,000      B. 99,996      C. 100,000      D. 100,020      E. None of the above

19. When painting a previously unpainted wall, you can paint 250 sq. ft per gallon. If you are repainting a wall, you can paint 400 sq. ft per gallon. Which of the following are you able to paint?

- A. An unpainted wall that is 30' long by 9' tall  
B. A painted wall that is 25' long by 18' tall  
C. A first and second coat on a wall that is 20' long by 10' tall  
D. Two coats on a painted wall that is 21' long by 10' tall  
E. None of the above

20. Write  $8.472 \times 10^8$  in standard notation ?

- A. 847,200,000      B. .00000008472      C. 84.7200000      D. 847,200,000,000      E. None of the above

21. When raising money for the school pep club, the first 300 students each donate a quarter. Each of the next 20 students donate \$5. How much does the mean donation increase from the first 300 students to the full 320 students?

- A. \$0.30      B. \$0.54      C. \$0.55      D. \$2.63      E. None of the above

22. If a 150 mL solution is currently 20% bleach, how much water would have to be added to make the solution contain only 5% bleach?

- A. 15 mL      B. 360 mL      C. 450 mL      D. 600 mL      E. None of the above

23. Proper factors are all the factors of a number except for the number itself. What is the sum of all proper factors of 36?

- A. 42      B. 49      C. 55      D. 61      E. None of the above

24. What is the next number in the sequence if the pattern continues? 2, 8, 18, 32, \_\_\_\_

- A. 42      B. 50      C. 52      D. 62      E. None of the above
- 

Use the table to of values for problems #25 through 27.

Student	Exam Pts	Homework Pts
A	70	30
B	210	30
C	180	20
D	60	40
E	175	25
<b>Total</b>	_____	

25. Assuming that at least one person got the maximum number of points possible in each category, how many points were possible in this class?

- A. 130      B. 200      C. 230      D. 250      E. None of the above

26. Which student got exactly 80% of the possible points?

- A. Student A      B. Student B      C. Student C      D. Student D      E. Student E

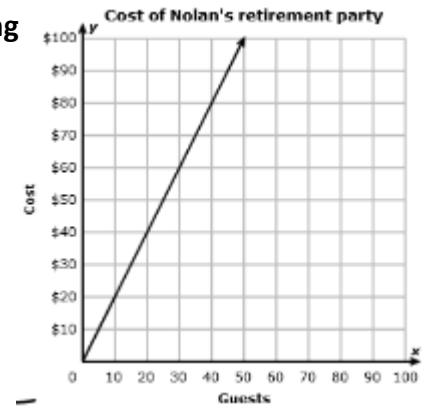
27. Which statement is **NOT** true based on the data?

- A. Student B earned more than twice as many points as Student A.  
B. Student C had six-sevenths the number of points as Student B.  
C. Student D has half as many points as Student C.  
D. Student D has three-fifths as many points as Student E.  
E. All of the statements are correct.

28. Starting with the third term, each term of a sequence is the sum of the previous two terms. What is the seventh term if the first two terms are -9 and 7

- A. 3                      B. 11                      C. 30                      D. 41                      E. None of the above

Use the graph for problems #29-31. To the right is a graph relating the cost of a retirement party to the number of guests.



29. Which of the following is true about the graph?
- A. The relationship is neither linear nor proportional.  
 B. The relationship is linear but not proportional.  
 C. The relationship is proportional but not linear.  
 D. The relationship is both proportional and linear.  
 E. It is linear but we cannot tell whether it is proportional.
30. What does the point (40,80) mean?
- A. The cost of hosting a party for 40 guests is \$80.  
 B. The cost of hosting a party for 80 guests is \$40.  
 C. Each of the first 40 guests cost \$80.  
 D. Each of the first 80 guests cost \$40.  
 E. None of the above
31. What is the constant of proportionality?
- A.  $\frac{1}{2}$                       B. 1                      C. 2                      D. Does not exist                      E. None of the above

32. A series of consecutive odd numbers starts with the number  $n$ . What is the sum of the first five terms?

- A.  $n + 8$                       B.  $n + 10$                       C.  $5n + 5$                       D.  $5n + 20$                       E. None of the above

33. When you square a real number, it is ...

- A. Always greater                      B. Always lesser                      C. Never greater                      D. Never lesser  
 E. None of the above

34. What is .112 when written as a fraction in simplest form?

- A.  $\frac{1}{112}$                       B.  $\frac{1}{12}$                       C.  $\frac{112}{1000}$                       D.  $\frac{14}{125}$                       E. None of the above

35. Which of the following is the greatest?

- A.  $8.\bar{9}$       B.  $3^2$       C.  $\sqrt{82}$       D.  $\frac{999}{112}$       E.  $2.9 \cdot 3.1$

36. A perfect cube is a natural number to the third power. How many perfect cubes are less than 1000?

- A. 8      B. 9      C. 10      D. 11      E. None of the above

37. Where  $a$  and  $b$  are both negative integers,  $a^b$  is always...

- A. Negative      B. A fraction      C. Rational      D. All of the above      E. None of the above

For problems 38 – 40 use  $x = -3$ ,  $y = 2$ ,  $z = \frac{1}{2}$ .

38. Simplify  $(4z - x)^y$ .

- A. 1      B. 2.25      C. 25      D. 56.25      E. None of the above

39. Simplify  $x^y + 7z$ .

- A.  $10\frac{1}{2}$       B.  $-5\frac{1}{2}$       C.  $-1\frac{1}{2}$       D.  $16\frac{1}{2}$       E. None of the above

40. Simplify  $xy + yz - xz$ .

- A. -7      B.  $-5\frac{1}{2}$       C.  $-3\frac{1}{2}$       D. 0      E. None of the above