

Kansas City Area Teachers of Mathematics  
2012 KCATM Math Competition

**ALGEBRA  
GRADE 5**

**INSTRUCTIONS**

- **Do not open this booklet** until instructed to do so.
- Time limit: **15 minutes**
- You **may use calculators** on this test.
- Use the  **$\pi$  key** on your calculator **or 3.14** as the approximation for pi.
- 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.

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

School \_\_\_\_\_

- Write an expression for the following: **“three more than twice a number”**  
 A.  $2n - 3$       B.  $2n + 3$       C.  $n - 3$       D.  $3x + 2$       E. None of the above
- The function equation:  $d = rt$  expresses the distance in terms of rate (mph) and time (hr.). Find the distance if the rate is 70 miles per hour and the time is 4 hours.  
 A.  $d = 74$  mi.    B. 17.5 mi.      C. 280 mi.      D. 66 mi.      E. None of the above
- Find the next number in the sequence: 120, 60, 30, ?  
 A. 20      B. 15      C. 10      D. 0      E. None of the above

- What is the rule in the function table showing the data for the cost of concert tickets?

t # of tickets	c cost
1	\$60
2	\$110
3	\$160
4	\$210

- $c = t + \$59$
- $c = \$50t$
- $c = \$60t$
- $c = \$50t + \$10$
- None of the above

- Determine the value of n in the equation:  $5(x + 2) = 45$   
 A. 5      B. 6      C. 7      D. 9      E. None of the above

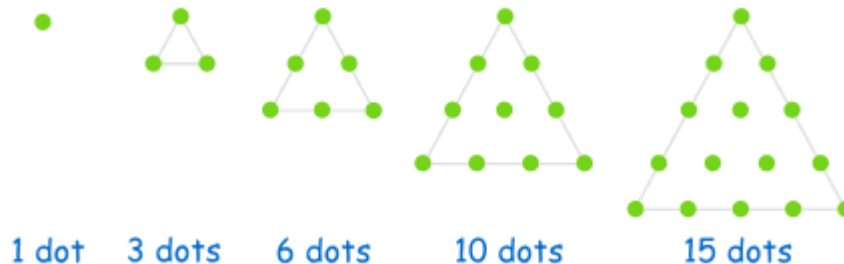
- Use the coins to determine the ratio of pennies to dimes.



- 5 to 3
- 4 to 3
- 5 to 4
- 3 to 5
- None of the above

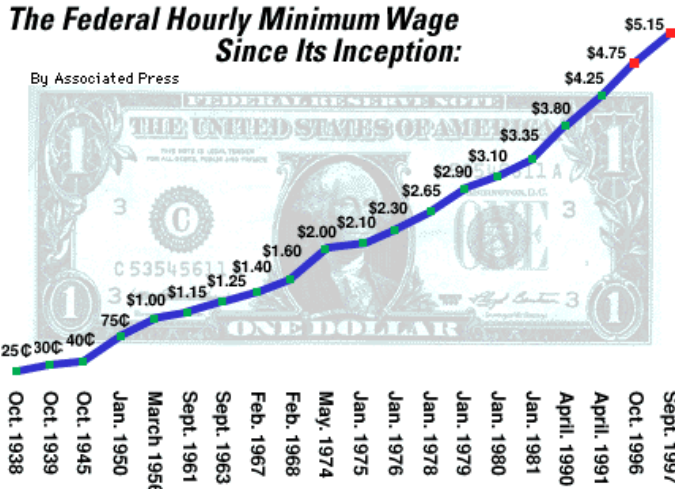
- If one dozen roses cost \$48, what is the cost of one rose?  
 A. \$2      B. \$3      C. \$4      D. \$5      E. None of the above

- How many dots would be in the 8<sup>th</sup> triangular number?



- 28
- 36
- 45
- 55
- None of the above

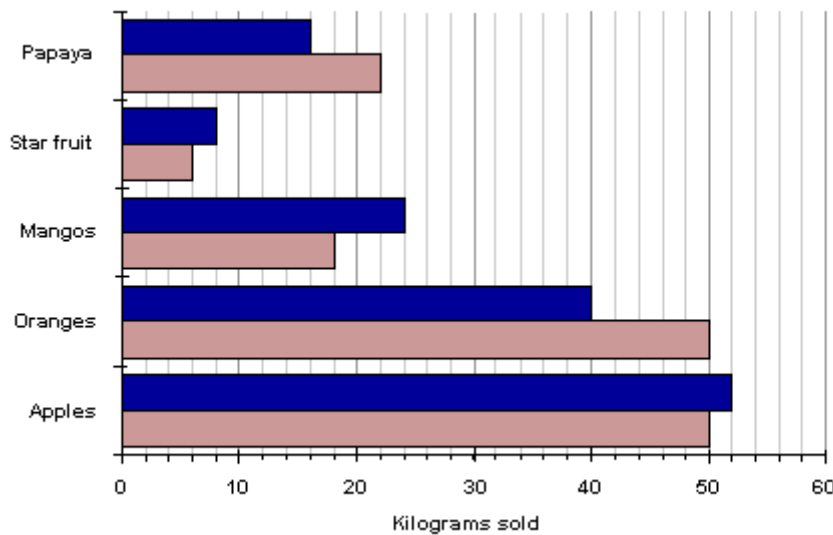
9. If  $r = s - 34$ , what is the value of “s” when  $r = 19$ ?  
 A.  $s = 53$       B.  $s = 15$       C.  $s = 18$       D. 52      E. None of the above
10. Use the graph below to determine the change in minimum wage from 1938 to 1997.



Graph from: <http://mste.illinois.edu>

- A. \$4.50      B. \$5.00      C. \$4.90      D. \$4.80      E. None of the above
11. Which sign would be correct when comparing the following numbers:  
 $0.856$  \_\_\_\_  $0.85$   
 A. <      B. >      C. ≤      D. ≥      E. None of the above
12. Which inequality is **incorrect**?  
 A.  $\frac{1}{2} > \frac{1}{4}$       B.  $25\% > 0.20$       C.  $7.1 < 7.2$       D.  $-5 > -4$       E. None of the above
13. Jaime’s mom is one year less than twice as old as he is. The sum of their ages is 89. How old is Jaime?  
 A. 28      B. 30      C. 32      D. 29      E. None of the above
14. Which table shows the data for the linear equation:  $y = 10x - 14$  ?  
 A.      B.      C.      D.      E. None of the above
- | x  | y   |
|----|-----|
| 5  | 36  |
| 8  | 66  |
| 11 | 96  |
| 14 | 126 |
- | x | y  |
|---|----|
| 2 | 6  |
| 4 | 30 |
| 6 | 56 |
| 8 | 66 |
- | x | y  |
|---|----|
| 1 | -4 |
| 3 | 16 |
| 5 | 34 |
| 7 | 56 |
- | x  | y   |
|----|-----|
| 10 | 86  |
| 11 | 96  |
| 12 | 106 |
| 13 | 126 |
15. Simplify:  $5 \times 6 - 4 \times 2 + 7$   
 A. 27      B. -6      C. 59      D. 29      E. None of the above
16. Find the amount of tax on \$100 if the tax rate is .0865.  
 A. \$0.87      B. \$8.65      C. \$86.50      D. \$865      E. None of the above

17. Use the graph to determine the mean of the oranges over the two days.



- A. 10
- B. 40
- C. 45
- D. 50
- E. None of the above

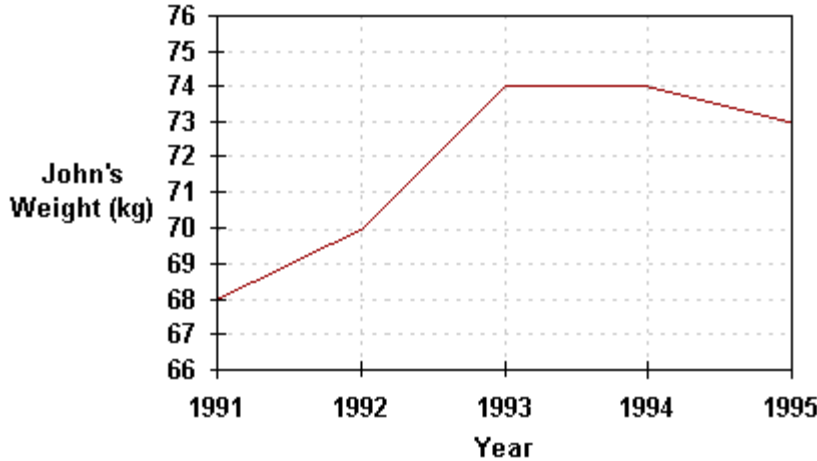
Graph from: <http://www.mathleague.com/help/data/data.htm>

18. In the table of values, what would be the missing value?

<b>Input</b>	1	2	3	4	5
<b>Output</b>	-18	-14	-10	-6	?

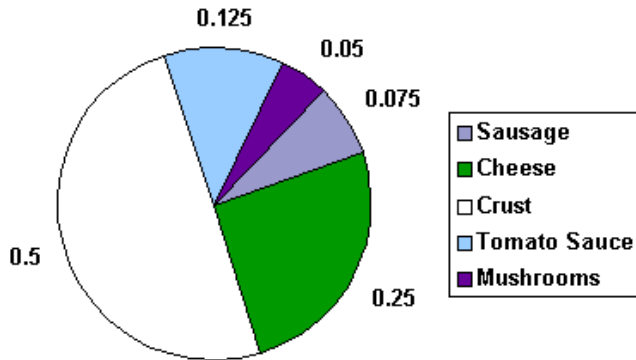
- A. -4
  - B. -2
  - C. 0
  - D. 2
  - E. None of the above
19. Find the value for the expression:  $[6 \times (5 - 3)^3]$
- A. 36
  - B. 30
  - C. 14
  - D. 48
  - E. None of the above
20. Distribute:  $-(-6x + 11) =$
- A.  $-5x$
  - B.  $6x - 11$
  - C.  $-6x + 11$
  - D.  $-6x - 11$
  - E. None of the above
21. Which statement shows the **identify property of multiplication**:
- A.  $5 \times 1 = 5$
  - B.  $5 \times 3 = 3 \times 5$
  - C.  $5(3 + 1) = 15 + 5$
  - D.  $3 \times (5 \times 2) = (3 \times 5) \times 2$
  - E. None of the above
22. Which statement shows the **commutative property of addition**?
- A.  $(3 + 4) + 2 = 3 + (4 + 2)$
  - B.  $(7 \times 8) \times 2 = 7 \times (8 \times 2)$
  - C.  $6(5 + 3) = 30 + 12$
  - D.  $9 + (2 + 5) = 9 + (5 + 2)$
  - E. None of the above
23. A dog is said to age seven times as fast as a human. If your dog is  $13 \frac{1}{2}$  years old, how old is that in dog years?
- A. 13.5 yr.
  - B. 91.8 yr.
  - C. 94.5 yr.
  - D. 91 yr.
  - E. None of the above
24. Student Council has a President, Vice President, Secretary, and Treasurer plus one person from each of the classrooms in the school from all grades K-5. If there are 3 classes per grade, how many total students are in Student Council?
- A. 15
  - B. 18
  - C. 21
  - D. 22
  - E. None of the above

25. Use the data from **John's weight** to determine which year John maintained his weight. Graph from: <http://www.mathleague.com/help/data/data.htm>



- A. 1991
- B. 1992
- C. 1993
- D. 1994
- E. None of the above

26. Use the **pizza data** to determine the percent of the pizza is sausage, mushrooms, tomato sauce, and cheese. Graph from: <http://www.mathleague.com/help/data/data.htm>



- A. 13%
- B. 80%
- C. 33%
- D. 50%
- E. None of the above

27. The data showing the ages of the first fifteen people in line to ride the Wizarding World of Harry Potter ride at Universal Studios in Orlando, FL on one day is below. What was the **range** of their ages?

8, 12, 45, 36, 19, 12, 13, 7, 11, 13, 15, 56, 31, 25, 29

- A. 12 and 13
- B. 49
- C. 22
- D. 15
- E. None of the above

28. If 
$$\begin{array}{r} 913 \\ - 73N \\ \hline 175 \end{array}$$

Find N.

Use N and solve this problem:

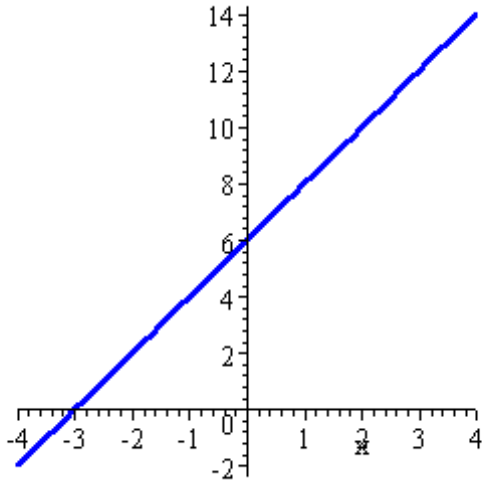
$$\begin{array}{r} 56,232 \\ + \quad N2N \\ \hline \end{array}$$

- A. 56,454
- B. 56,757
- C. 56,959
- D. 57,060
- E. None of the above

29. You have 150 yards of rope. You want to cut the rope into 18 inch pieces. How many pieces of rope would you get?

- A. 75      B. 100      C. 150      D. 300      E. None of the above

30. Select the set of points shown in the linear equation below:



- A. (-3,0) (-1,4) (0,6) (1,8)  
 B. (0,-3) (4,-1) (6,0) (8, 1)  
 C. (-2,2) (3,10) (4,12) (2,10)  
 D. (2,-2) (10,3) (12,4) (10,2)  
 E. None of the above

31. There is a sale on shoes that says “Buy ONE, get ONE at half price.” You pay for the highest price pair of shoes and receive half off the less expensive pair. **How much do you save** if you bought two pair of shoes that originally cost \$57.00 and \$36.00?

- A. \$18      B. \$21      C. \$12      D. \$93      E. None of the above

32. Evaluate:  $(-5)^2$

- A. -10      B. 10      C. -25      D. 25      E. None of the above

33. The record high temperature in the US was in Death Valley, CA on July 10, 1913. Find the temperature with these clues: a. The temperature was between  $11^2$  and  $12^2$ ; b. It is an even number; c. It can be divided by 67.

- A.  $124^\circ\text{F}$ .      B.  $101^\circ\text{F}$ .      C.  $132^\circ\text{F}$ .      D.  $134^\circ\text{F}$ .      E. None of the above

34. Determine the total amount spent at a restaurant if the meal cost \$30, you left a tip of 15% of the cost of the meal, and you paid a 9% tax on the cost of the meal.

- A. \$37.20      B. \$34.50      C. 32.70      D. \$37.61      E. None of the above

35. Which equation represents the equation where twelve times x minus four is 32.

- A.  $x + 4 = 32/12$       B.  $12x + 4 = 32$       C.  $2x - 32 = 4$       D.  $12x - 4 = 32$   
 E. None of the above

36. Determine the cost of taking your family to Worlds of Fun in 2012 if you buy 5 daily tickets at a cost of \$44.99, 3 souvenirs at \$12 each, food for the family that totaled \$42.

- A. \$278.95      B. \$302.95      C. \$386.95      D. \$326.95  
 E. None of the above

37. You can buy 4 large pizzas for the same price as 2 large pizzas, 8 one-dollar drinks, and 4 - \$3 orders of breadsticks. How much does each pizza cost?

- A. \$8      B. \$9      C. \$10      D. \$12      E. None of the above

38. The sum of two numbers is 10. Twice the first, increased by the second number, is 18. Find the first number and the second number.

- A. 6, 4      B. 8, 2      C. 3, 7      D. 5, 5      E. None of the above

39. You have two lists of three consecutive even numbers. The sum of the first number on each list is 10. If twice the second number on the first list has the same value as the first number on the second list, what is the largest set of consecutive even numbers?

- A. 2, 4, 6      B. 4, 6, 8      C. 6, 8, 10      D. 8, 10, 12  
E. None of the above

40. You have \$1.40 in coins consisting of dimes and nickels. If the number of nickels is five times greater than the number of dimes, how many of dimes do you have?

- A. 3 dimes      B. 4 dimes      C. 5 dimes      D. 6 dimes  
E. None of the above

Shade the correct answer!

Example: A ● C D E

Name \_\_\_\_\_

School \_\_\_\_\_

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

- 21. A B C D E
- 22. A B C D E
- 23. A B C D E
- 24. A B C D E
- 25. A B C D E
- 26. A B C D E
- 27. A B C D E
- 28. A B C D E
- 29. A B C D E
- 30. A B C D E
- 31. A B C D E
- 32. A B C D E
- 33. A B C D E
- 34. A B C D E
- 35. A B C D E
- 36. A B C D E
- 37. A B C D E
- 38. A B C D E
- 39. A B C D E
- 40. A B C D E



Shade the correct answer!

Example: A  C D E

Name \_\_\_\_\_

School \_\_\_\_\_

**ANSWER KEY**1. A  C D E2. A B  D E3. A  C D E4. A B C  E5. A B  D E6. A B C  E7. A B  D E8. A  C D E9.  B C D E10. A B  D E11. A  C D E12. A B C  E13. A  C D E14.  B C D E15. A B C  E16. A  C D E17. A B  D E18. A  C D E19. A B C  E20. A  C D E21.  B C D E22. A B C  E23. A B  D E24. A B C  E25. A B  D E26. A B C  E27. A  C D E28. A B C  E29. A B C  E30.  B C D E31.  B C D E32. A B C  E33. A B C  E34.  B C D E35. A B C  E36. A  C D E37. A B  D E38. A  C D E39. A B C  E40. A  C D E