Kansas City Area Teachers of Mathematics
2011 KCATM Math Competition

PRE-ALGEBRA
GRADE 6

INSTRUCTIONS

- **Do not open this booklet** until instructed to do so.

- Time limit: **20 minutes**

- You **may use calculators** on this test.

- Use the π **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.

1. Find the next number in the sequence: 7, 21, 63, …
    A. 104   B. 84   C. 126   D. 189   E. None of the above

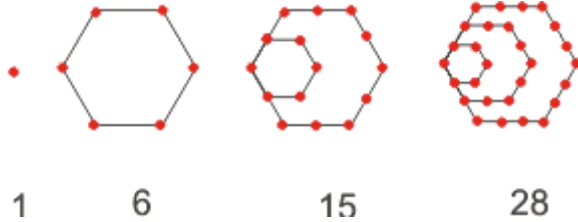2. How many dots will be in the next hexagonal number as in Figure 1?

1   6   15   28
Figure 1

A. 43   B. 44
C. 45   D. 46
E. None of the above

3. Write the expression for "thirty-five minus four times a number".
    A. 4n - 35   B. 30 – 20n   C. 35 – 4n
    D. 5 – 120n   E. None of the above

4. Find one third of one half of 24.
    A. 2   B. 3   C. 6   D. 4   E. None of the above

5. Which sign would be correct when comparing the following numbers:
                    0.56 _____ 15/25
    A. <   B. >   C. $\leq$ D. $\geq$ E. None of the above

6. Which inequality is **incorrect**?
    A. 0.013 > 0.0125   B. 4.30 > 4.31   C. 11.5 < 25/2
    D. 1,000,000 > 999,999   E. None of the above

7. "Rise/run" on a coordinate plane is known as which vocabulary term?
    A. point   B. slope   C. change of x
    D. change of y   E. None of the above

8. Solve for the variable, n: 3n + 14 = -13
    A. n = -9   B. n = 1/3   C. n = -1   D. n = 10   E. None of the above

9. Find the value for the expression: $3(4 – 2)^2 + 10/2$
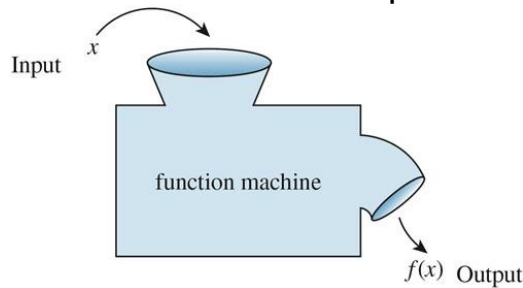   A. 41   B. 17   C. 11   D. 135   E. None of the above

10. Distribute: 3x(2x - 1) =
    A. 5x - 1   B. $6x^2$ - 1   C. $3x^2$ D. $6x^2 – 3x$ E. None of the above

11. Which statement shows the **symmetric property**:
    A. If x = 3, then x = -3   B. If 3 = x, then x = 3
    C. 2(4) = 4(2)   D. 5 + 7 = 7 + 5
    E. None of the above

12. Which statement shows the **associative property of addition**?
    A. (13 + 4) + 2 = (4 + 13) + 2   B. (7 + 28) + 2 = 7 + (28 + 2)
    C. 4(5 + 1) = 20 + 2   D. (3 x 2) x 7 = 3 x (2 x 7)
    E. None of the above

13. Simplify the expression: $5x^2 + 3x - 7 + (x^2 - 4x + 5)$
    A. $6x^2 - x - 2$ B. $5x^2 - x - 2$
    C. $6x^2 + 7x + 12$ D. 2   E. None of the above

14. Your classroom has 24 desks. Which is a way the desks cannot be
    arranged in rows and columns to equal 24 desks?
    A. 8 rows, 3 columns   B. 2 rows, 12 columns
    C. 6 rows, 4 columns   D. 3 rows, 7 columns
    E. None of the above

15. How many people can attend a concert if 4 large buses are full with
    60 people each and 4 small buses have 20 people each?
    A. 280 people   B. 320 people   C. 88 people
    D. 360 people   E. None of the above

16. What is $(-5)^2$?
    A. 25   B. 25   C. 10   D. -10   E. None of the above

17. What is a 15% tip on a restaurant bill of $28.00?
    A. $4   B. $3.90   C. $4.50   D. $4.25   E. None of the above

18. How long would it take to drive 266 miles at 70 miles per hour?
    A. 3.8 hrs.   B. 3.5 hrs.   C. 4.1 hrs.
    D. 4.2 hrs.   E. None of the above

19. Which value of x makes the inequality true? $14 > x^2 - 5$
    A. 8   B. 4   C. 6   D. -5   E. None of the above

20. Which statement is **false**?
    A. |3| = 3   B. |-5| = 5   C. |-8| = 8   D. |7| = 7
    E. None of the above

21. A blueprint shows a bedroom that is 10' by 12'. The scale of the blueprint is 1' = ¼ inch. What are the dimensions of the room on the blueprint?

    A. 2.5" by 3"   B. 2" by 3"   C. 5" by 6"
    D. 3 1/3" by 4"   E. None of the above

22. Four consecutive numbers have a sum of 54. What is the largest number?
    A. 13   B. 14   C. 15   D. 16   E. None of the above

23. Write the expression: x – 2   in words.
    A. the product of x and 2   B. the difference between x and 2
    C. the sum of x and 2   D. x divided by 2
    E. None of the above

24. Express the perimeter of a rectangle with b = base and h = height.
    A. b + h   B. 2(b + h)   C. ½ bh   D. bh   E. None of the above

25.   Which number that will give you an integer answer for
    "half of a half of a half of a number"?

    A. 12   B. 10   C. 26   D. 28   E. None of the above

26. What is the greatest common factor of 40 and 36?
    A. 1   B. 2   C. 8   D. 4   E. None of the above

27. What is the next number in the sequence: -8, 4, -2, 1, ___
    A. -1/2   B. -1/4   C. 1/4   D. ½   E. None of the above

28. Abby purchased twice as many balloons as Sam. Sam purchased half as many balloons as Thomas. If Thomas purchased 6 balloons, how many balloons did Abby buy?
    A. 3   B. 12   C. 9   D. 6   E. None of the above

29. Write an equation for: "Eleven more than five times a number is three."
    A. 11(5x) = 3   B. 3 = 5x - 11
    C. 5x + 11 = 3   D. 11+ 3 = 5x
    E. None of the above

30.   Which set is a verbal way to express the set: {…-5, -3, -1} ?
    A. {negative integers}   B. {negative odd integers}
    C. {whole numbers"   D. {odd integers}   E. None of the above

Use the **function machine** for problems 31-32.

31. If the rule is "-1/2 x + 7", what is the output when the input is 12?
     A. 1   B. 9.5   C. 13   D.   -1   E. None of the above

32. If f(x) = 56 and the rule is f(x) = 2x, what is the input?
     A. 28   B. 112   C. 54   D.   27   E. None of the above

33. Find the value of: [-(12 – 6)/2] + 6/2
     A. -18   B. 6   C. -6   D. 0   E. None of the above

34.   What is the median of the following data: 3, 6, 7, 2, 14, 23, 0, 8
     A. 6.5   B. 6   C. 14   D. 23   E. None of the above

35. How many rooms will KCATM need if each room holds 28 people and there are 1000 students testing?
     A. 35 rooms   B. 36 rooms   C. 37 rooms
     D. 40 rooms   E. None of the above

36. If you walk a mile every 20 minutes, how long will it take you to walk 3.5 miles?
     A. 1 hour   B. 1 hr. 5 min.   C. 1 hr. 10 min.
     D. 1 ½ hours   E. None of the above

37. Johnathan is 4 years younger than his sister. If the sum of their ages is twenty-four, how old is Johnathan?
     A. 8   B. 10   C. 12   D. 14   E. None of the above

38. Multiply: (x – 5)(x + 5)
     A. x^2 - 25   B. 0   C. 2x   D. x^2 + 25   E. None of the above

39. What is $(-2)^3$?
     A. 6   B. -6   C. -8   D. 8   E. None of the above

40. What is the next number in the pattern: 1/10, 1/100,1/1000, ____
     A. 0.0001   B. 0.001   C. 0.01   D. 0.00001   E. None of the above