

Kansas City Area Teachers of Mathematics  
2011 KCATM Math Competition

**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  $\pi$  **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.

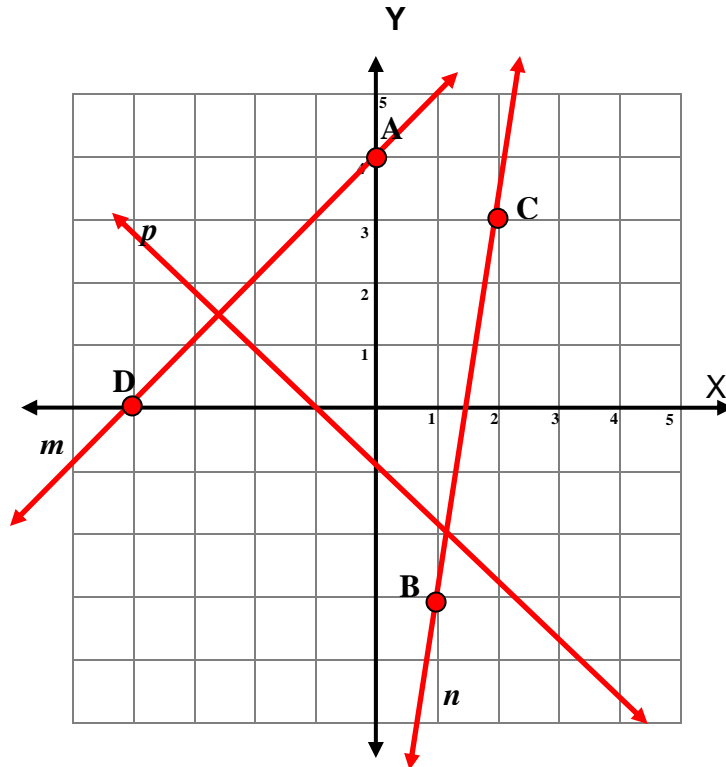
1. Evaluate the expression:  $14 - x^2$  when  $x = -4$ .  
A. 30      B. 18      C. 2      D. 10      E. None of the above
2. Evaluate the expression:  $6(2x + 1) - 7$  when  $x = 10$   
A. 114      B. 119      C. 125      D. 66      E. None of the above
3. The prediction model of the cost of gasoline per gallon is  $C = p(107\%)$  when the price of gas increases by 7%. What is the new cost (C) of gasoline if the current price (p) is \$2.86?  
A. \$4.86      B. \$2.97      C. \$3.06      D. \$3.93      E. None of the above
- 

**Solve the equations 4-8 for the value of x.**

4. Solve:  $8x + 5 = 23$  Round to the nearest tenth.  
A. 2.0      B. 2.3      C. 3.5      D. 8.0      E. None of the above.
5. Solve for x. (*Find **all** of the values that work in the equation.*)  $|x + 1| = 4$   
A. 3      B. -5      C. 3 or -5      D. 0 or 3      E. None of the above
6. Solve for x:  $\frac{x+2}{4} = \frac{12}{3}$   
A.  $4\frac{1}{3}$       B.  $3\frac{2}{3}$       C. 11      D. 14      E. None of the above
7. Solve:  $-2x < 8$   
A.  $x < -4$       B.  $x > -4$       C.  $x > 4$       D.  $x < -4$       E. None of the above
8. Solve:  $x^2 + 7x + 10 = 0$   
A. 2, 5      B. -2, -5      C. 1, 10      D. -1, -10      E. None of the above
- 

9. What is the distance between -14 and +8 on a number line?  
A. 6      B. -6      C. 22      D. -22      E. None of the above
10. What is the next term in the pattern? 225, 196, 169, 144, ...  
A. 121      B. 129      C. 115      D. 117      E. None of the above
11. Write an equation for three consecutive odd numbers whose sum is two hundred nineteen.  
A.  $x + x + 1 + x + 2 = 209$       B.  $x + x + 2 + x + 4 = 209$       C.  $x + x + 1 + x + 2 = 219$   
D.  $x + x + 2 + x + 4 = 219$       E. None of the above

Use the graph with lines  $m$ ,  $n$ , and  $p$  for problems 12.-18.



12. What type of line is the y-axis?  
 A. horizontal    B. vertical
  
13. What is the equation of line  $m$ ?  
 A.  $y = -1x + -1$       B.  $y = x + 4$       C.  $y = 4/3 x - 1$   
 D.  $y = 4$       E. None of the above
  
14. What is the slope of line  $n$ ?  
 A.  $1/3$       B. 3      C. 5      D.  $1/5$       E. None of the above
  
15. What is the equation of line  $p$ ?  
 A.  $y = -1x + -1$       B.  $y = x + 4$       C.  $y = 4/3 x - 1$   
 D.  $y = 4$       E. None of the above
  
16. Line  $m$  and Line  $p$  are  
 A. parallel      B. perpendicular      C. neither parallel nor perpendicular  
 D. both parallel and perpendicular      E. None of the above
  
17. What is the slope of the line through points A and C?  
 A.  $1/2$       B.  $-1/2$       C. 2      D. -2      E. None of the above
  
18. Point B is in which quadrant?  
 A. I      B. II      C. III      D. IV      E. None of the above

19. Two consecutive numbers have a sum of 123. What is the **largest number**?  
 A. 47      B. 75      C. 62      D. 64      E. None of the above

20. Alice is twice as old as Bobby. Bobby is three years older than Chetty who is 12. Which expression helps you find how old Alice is?

A.  $2(12) + 3$     B.  $2(12 + 3)$     C.  $2(3) + 12$     D.  $12(2 + 3)$     E. None of the above

21. You earned the following 4 scores on your math tests: 75%, 72%, 84%, and 79%. What do you need on your 5<sup>th</sup> test to have a mean of 81% on your 5 tests?

A. 81%      B. 85%      C. 89%      D. 97%      E. None of the above

22. Less one-half of a number from twice that same number is 27. What is the number?

A. 22      B. 20      C. 18      D. 16      E. None of the above

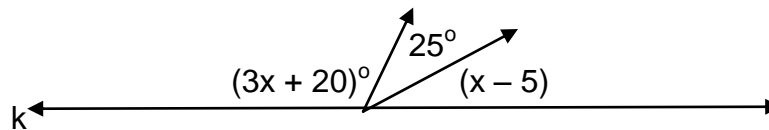
23. Determine the value of  $(4^2)^{-1}$

A. -8      B. -16      C.  $-1/16$       D.  $1/16$       E. None of the above

24. Multiply:  $(2x - 5)(x + 3)$

A.  $3x - 2$       B.  $2x^2 + 11x - 2$       C.  $2x + 1x - 2$   
 D.  $2x^2 + 1x - 15$       E. None of the above

25. Given line  $k$ , what is the measure of the **obtuse** angle in the diagram below?



A.  $125^\circ$       B.  $35^\circ$       C.  $30^\circ$       D.  $105^\circ$       E. None of the above

26. Find the coordinate pair solution.
- $$\begin{aligned} 2x - 3y &= -10 \\ x + 3y &= 4 \end{aligned}$$

A. (2, -2)      B. (7, 1)      C. (1, 4)      D. (-5, 0)      E. None of the above

27. Find the function value of  $g(-1)$  when  $g(x)$  is defined as  $4x^2 - x + 1$

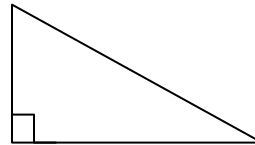
A. -4      B. 6      C. 2      D. -2      E. None of the above

28. Thirteen more than the difference between of a number and twelve is four. What is the number?  
 A. 16      B. 4      C. 6      D. 3      E. None of the above
29. What is the value of  $241^0$ ?  
 A. 0      B. 12      C. 1      D. undefined      E. None of the above
30. Find the slope of a line through the following points: A(12, -1) and B(-2, 5)  
 A.  $8/3$       B.  $3/8$       C.  $-8/3$       D.  $-3/8$       E. None of the above
31. What is the most correct statement represented by the expression  $2(x - 8)$ ?  
 A. Eight less than the product of two and a number .  
 B. Twice the difference between eight and a number.  
 C. Twice the difference between a number and eight.  
 D. Eight less than twice a number.  
 E. None of the above

32. The length of a rectangle is represented by "x". The width is half of the length. Which expression represents the **perimeter** of the rectangle?



- A.  $(0.5)x^2$       B.  $x$       C.  $3x$       D.  $4x$       E. None of the above
33. What is the length of a leg of a right triangle with the other two sides are 12 and 13.  
 A. 6      B. 8      C. 10      D. 5  
 E. None of the above



34. One Mexican Peso is currently equivalent to 0.0824 of a US dollar. How many Pesos would \$250 be?  
 A. 206 Pesos      B. 3033 Pesos      C. 258 Pesos  
 D. 21 Pesos      E. None of the above
35. The cost of eggs in 1950 was \$0.79 and in 2010 the cost of eggs was \$1.89. What is the rate of change from 1950 to 2010.  
 A. 1.8 cents per year      B. 1.9 cents per year      C. 2.1 cents per year  
 D. 2.2 cents per year      E. None of the above

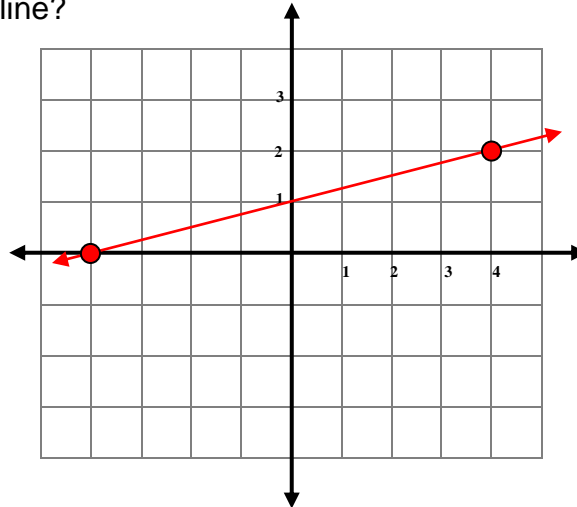
36. Which point is **NOT** a solution to the equation:  $y \geq x + 6$   
 A. (5, 11)      B. (-2, -5)      C. (4, 12)      D. (-7, 0)      E. None of the above

37. Solve for R in the following equation:  $\frac{R+3}{R} + 4 = 2$

- A. -2      B. -1      C. 0      D. 1      E. None of the above

38. Which equation is the graph of the line?

- A.  $y = 1/2 x$   
 B.  $y = 1/4 x$   
 C.  $y = 1/4 x + 1$   
 D.  $y = 2/8 x - 1$   
 E. None of the above



39. The following table shows the amount of money you would pay for a service man to come to your home to work on the plumbing. How much would it cost if the service man was at your home for 10 hours?

Hours	0	1	2	3	4
Wage	\$75	\$125	\$175	\$225	\$275

- A. \$550      B. \$575      C. \$625      D. \$635      E. None of the above

40. Factor the quadratic:  $x^2 - 25$

- A.  $(x - 5)(x + 5)$       B.  $(x + 12)(x - 13)$       C.  $(x - 17)(x + 8)$   
 D.  $(x + 2)(x - 10)$       E. None of the above