Kansas City Area Teachers of Mathematics
2013 KCATM Math Competition

NUMBER SENSE
GRADES 7-8

NO CALCULATOR

INSTRUCTIONS

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

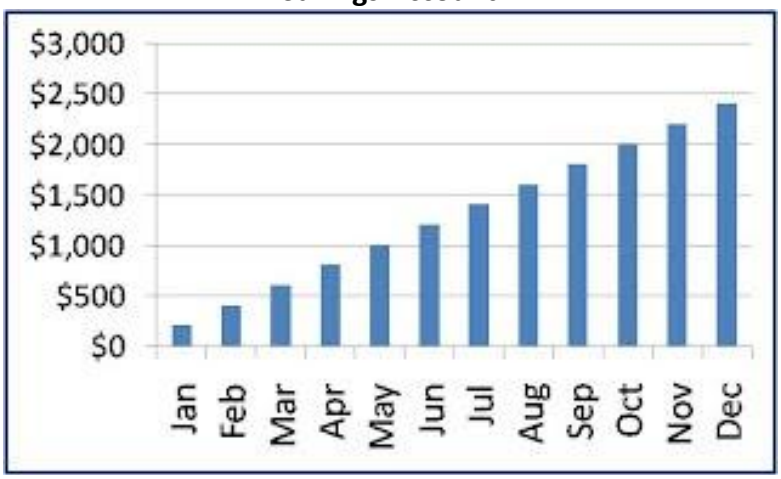
- Time limit: **20 minutes**
- You **may NOT use calculators**.
- Mark your answer on the Scantron sheet by **FILLING in the oval**.
- You **may not use rulers, protractors, or other measurement devices** on this test.
- Letter **"E" is "None of the above"** , which is a correct answer for some of the problems.
- With circles, **exact answers** will be given in terms of π.

Student Name _____ Student Number _____

School _____

Use the graph below for problems #1 and #2.

Savings Account



1. **Approximately** how much did the savings account going up each month *(rate of change)?*
   A. $100 B. $200 C. $300 D. $400

2. If the savings account balance was $2400 at the end of the year and continued to grow at the same rate, how much money would be in the account after two **more** years?
   A. $7800 B. $6800 C. $4800 D. $7200 E. None of the above

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3. Which number property is used in $y(3y - 4)$ to simplify the expression to $3y^2 - 4y$?
   A. Commutative Property of Addition B. Commutative Property of Multiplication
   C. Associative Property of Multiplication D. Distributive Property
   E. None of the above

4. In solving the multi-step problem below, **which property listed is NOT used** as a reason for a step in the process of solving the equation?

$3x + (2x - 7) = 28 + x$	*Given*
$(3x + 2x) - 7 = 28 + x$	_____
$5x - 7 = 28 + x$	_____
$4x - 7 = 28$	_____
$4x = 35$	_____
$x = 8.5$	_____

   A. Associative Property of Addition B. Subtraction Property of Equality
   C. Division Property of Equality D. Addition Property of Equality
   E. All properties were used.

5. Which is the **prime factorization** of 96?
   A. 2 x 2 x 2 x 3 x 3 B. $2^5 \times 3$ C. $2^4 \times 3^2$ D. $2^2 \times 3^3$ E. None of the above

6. What is the **sum** of: 1/3 + 1/2 + 5/6 ?
   A. 1 1/2 B. 7/12 C. 1 2/3 D. 1 3/6 E. None of the above

7. You weigh 83.6 kg, how many grams do you weigh?
   A. 836 g B. 8,360 g C. 83,600 g D. 8.36 g E. None of the above

8. **Convert:** 1/2 mile = _____ yards , given 1 mile = 5280 ft.
   A. 880 ft. B. 2,640 yds. C. 840 yds. D. 430 yds. E. None of the above

9. If you walked 3/8 of a mile each day M-F, and 1 ½ miles on both Saturday and Sunday, **how many miles** did you walk that week?
   A. 1 7/8 mi. B. 3 7/8 mi. C. 2 1/8 mi. D. 4 7/8 mi. E. None of the above

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Use the notation below for problems 10-12.
N = {Natural #}; W = {Whole #}; I = {Integers}; Irr. = {Irrational}; Rat.={Rational}; Real = {Real #}

10. The number: 13/3 is a member of which set(s)?
    A. I, Rat.,Real B. Rat., Real C. Irr., Real D. N,W E. None of the above

11. The number: 1 is a member of which sets?
    A. N, W B. N,W, I, Irr., Real C. N,W,I,Rat.,Real
    D. W,I, Rat., Real E. None of the above

12. The number: 7.272772777… is a member of which set(s)?
    A. N B. N,W C. Irr., Real D. Rat., Real E. None of the above

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13. A board was purchased at Home Depot for a building project. The department attendant was asked to cut the 12-foot board into fifths. How many pieces did she cut, and how long (in inches) was each piece?
    A. 60; 6" each B. 2 2/5; each 60" each C. 7; each 1 5/12 ft. each
    D. 5; 28 4/5" each E. None of the above

14. Three-fifths of 2/3 of 90 is equivalent to:
    A. 108 B. 36 C. 48 D. 60 E. None of the above

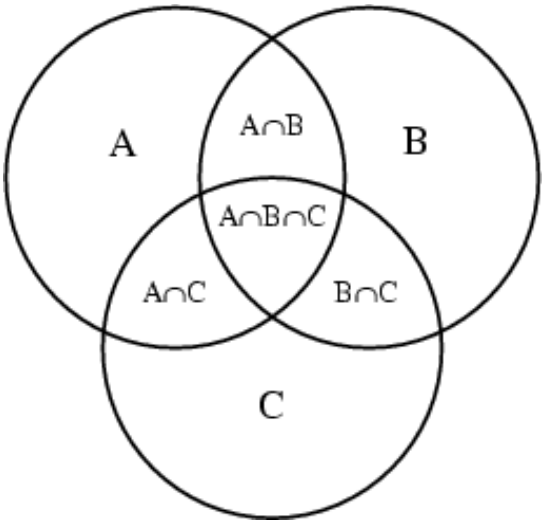
15. The fraction 7/8 is equivalent to which decimal value?
    A. 0.625 B. 0.785 C. 0.875 D. 0.580 E. None of the above

16. Find 10% of $83.20.
    A. $73.20 B. $0.83 C. $8.32 D. $83.20 E. None of the above

17. Which **fraction** represents the decimal: 7.075 ?
    A. $7\frac{3}{4}$ B. $7\frac{3}{40}$ C. $7\frac{3}{400}$ D. $4\frac{3}{4000}$ E. None of the above

18. What is the **next number** in the sequence: 3, 7, 15, 31, ___ ?
    A. 91 B. 63 C. 44 D. 87 E. None of the above

Use the Venn diagram for problems #19 and #20.



19. A middle school class has 28 students. The teacher discovers that 4 students have only brothers as sibling, 5 students have only sisters, and 1 student only has a pet. Six students have both a brother and a sister, but no pet. One has a sister and a pet, but no brother. Three have a brother and a pet, but no sister. Four students have a brother, a sister, and a pet. **How many students have no brother, no sister and no pet**.

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

20. **What does $A \cap B \cap C$ mean specific to this question**?
A. The students who have a brother and a sister.
B. The students who have a brother and a pet.
C. The students who have a sister and a pet.
D. The students who have a brother , a sister, and a pet
E. None of the above

21. Solve for x: $\frac{x}{3} = \frac{x+3}{6}$

A. 4 B. 3 C. 2 D. 1 E. None of the above

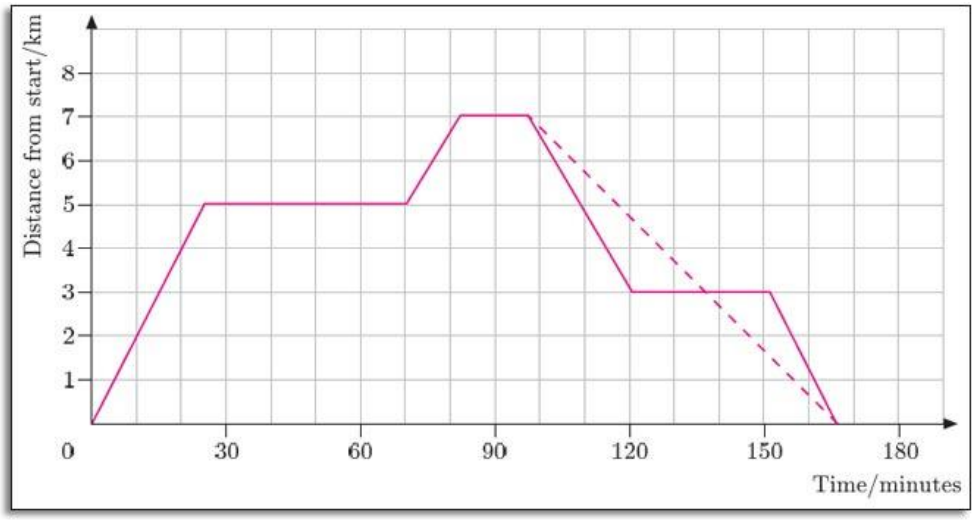
22. The ratio of three diameters is 3 : 5 : 7. If the diameters have a sum of 30 ft., what is the length of the **longest diameter**?
A. 10 ft. B. 7 ft. C. 21 ft. D. 14 ft. E. None of the above

23. Which statement is **NOT** always true about Real numbers?
A. There is always a number between any two numbers.
B. Real numbers can be positive, negative, or zero.
C. Multiplying by a number between 0 and 1 makes the original number smaller.
D. Multiplying by a negative integer makes the original number positive.
E. All are correct.

24. Write expressions for the next **three consecutive odd numbers** a number line when the first number , "n", is even.
A. n + 1, n + 3, n + 5 B. n, n + 1, n – 3 C. n, n + 2, n + 4
D. n, n +1, n +2 E. None of the above

25. Analyze the graph to estimate the length of time when the person was in a store shopping?

☺ A Girls Day Out Shopping! ☺



A. 2 ½ hours B. 2 ¾ hours C. 3 ½ hours D. 1 ½ hours

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26. In three years, Sam will be twice as old as Juan is now. The sum of their current ages is 33. **How old is Sam now?**

A. 21 B. 22 C. 20 D. 18 E. None of the above

27. Which of the following is **NOT** equivalent to 36%?

A. 0.36 B. 9/25 C. 36/100 D. 0.036 E. None of the above

28. Use "upside down" division to help you find the **LCM** *(least common multiple)* of 48 and 72.

2 | **48 72**

A. 3456 B. 144 C. 72 D. 84 E. None of the above

29. What is the value of **4!**

A. 4 B. undefined C. 24 D. 256 E. None of the above

30. Which number is **NOT** a prime number?

A. 1 B. 2 C. 53 D. 117 E. All are true

31. What is the value of |-33| ?

A. 0 B. -9 C. -33 D. 33 E. None of the above

32. $3\sqrt{27}+\sqrt{12}$ =

A. $3\sqrt{39}$ B. $11\sqrt{3}$ C. $8\sqrt{3}$ D. $3\sqrt{15}$ E. None of the above

33. Simplify the expression: $\sqrt{36} - 3 \times 6 - 5$

A. -19 B. -17 C. 13 D. 3 E. None of the above

34. Simplify: $\dfrac{27 - (3^2 - 4 \times 2)^2}{3 - 5}$

A. -13 B. -14 C. 13 D. 73/2 E. None of the above

35. Three stores have different prices for avocados. Which store offers the best deal when you buy one avocado?

Price Chopper	3 for $4.15
Hy-Vee	2 for $2.74
Apple Market	5 for $6.85

A. Price Chopper B. Hy-Vee C. Apple Market
D. Both Price Chopper and Hy-Vee E. None of the above

36. To the nearest half dollar, tabulate a 15% tip on a family meal costing $63.

A. $10.00 B. $9.50 C. $9.00 D. $10.50 E. None of the above

37. Evaluate the expression when n = -3 : $3n^2 - 4n + 2n^0$

A. 39 B. 41 C. 17 D. 37 E. None of the above

38. Evaluate: $(1/2)^{-3}$

A. -6 B. 1/8 C. 1/6 D. 8 E. None of the above

39. What is the value of $[(81)^{1/2}]^{1/2}$?

A. 20.25 B. 3 C. 1/3 D. 9 E. None of the above

40. You have an additional 20 % coupon off your total purchase, when you're buying an item with a 40% off sale price. What will your cost be for an item originally priced at $110.

A. $52.80 B. $44.00 C. $62.50 D. $66.00 E. None of the above

Shade the correct answer!
Example: A ● C D E

Name_____

School _____

1.	A	B	C	D	E	21.	A	B	C	D	E
2.	A	B	C	D	E	22.	A	B	C	D	E
3.	A	B	C	D	E	23.	A	B	C	D	E
4.	A	B	C	D	E	24.	A	B	C	D	E
5.	A	B	C	D	E	25.	A	B	C	D	E
6.	A	B	C	D	E	26.	A	B	C	D	E
7.	A	B	C	D	E	27.	A	B	C	D	E
8.	A	B	C	D	E	28.	A	B	C	D	E
9.	A	B	C	D	E	29.	A	B	C	D	E
10.	A	B	C	D	E	30.	A	B	C	D	E
11.	A	B	C	D	E	31.	A	B	C	D	E
12.	A	B	C	D	E	32.	A	B	C	D	E
13.	A	B	C	D	E	33.	A	B	C	D	E
14.	A	B	C	D	E	34.	A	B	C	D	E
15.	A	B	C	D	E	35.	A	B	C	D	E
16.	A	B	C	D	E	36.	A	B	C	D	E
17.	A	B	C	D	E	37.	A	B	C	D	E
18.	A	B	C	D	E	38.	A	B	C	D	E
19.	A	B	C	D	E	39.	A	B	C	D	E
20.	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	E	21.	A	●	C	D	E
2.	A	B	C	●	E	22.	A	B	C	●	E
3.	A	B	C	●	E	23.	A	B	C	●	E
4.	A	B	C	D	●	24.	●	B	C	D	E
5.	A	●	C	D	E	25.	A	B	C	●	E
6.	A	B	●	D	E	26.	●	B	C	D	E
7.	A	●	C	D	E	27.	A	B	C	●	E
8.	●	B	C	D	E	28.	A	●	C	D	E
9.	A	B	C	●	E	29.	A	B	●	D	E
10.	A	●	C	D	E	30.	●	B	C	D	E
11.	A	B	●	D	E	31.	A	B	C	●	E
12.	A	B	●	D	E	32.	A	●	C	D	E
13.	A	B	C	●	E	33.	A	●	C	D	E
14.	A	●	C	D	E	34.	●	B	C	D	E
15.	A	B	●	D	E	35.	A	B	C	D	●
16.	A	B	●	D	E	36.	A	●	C	D	E
17.	A	●	C	D	E	37.	A	●	C	D	E
18.	A	●	C	D	E	38.	A	B	C	●	E
19.	●	B	C	D	E	39.	A	●	C	D	E
20.	A	B	C	●	E	40.	●	B	C	D	E