Name_____ School_____

Arkansas Council of Teachers of Mathematics

Algebra I State Exam 2006

Select the best answer for each of the following questions and mark it on the answer sheet provided. Be sure to read all answer choices before making your selection. When you are finished with the multiple choice, please attempt the tiebreaker questions.

1. If $\dfrac{2x}{3} = 5, \dfrac{2y-2}{4} = 3,$ *and* $\dfrac{z}{2} + \dfrac{z}{3} = 5$, which of the following must be true?

a.   x > y
b.   y < z
c.   x = z
d.   z > x
e.   none of the above

2. A manufacturing company spends $1200 each day on plant costs plus $7 per item for labor and material. The items sell for $23 each. How many items must the company sell in one day to equal its daily costs?

a.   52
b.   75
c.   150
d.   200
e.   none of the above

3. A rectangle has a perimeter of 72 in. The length is 3 in. more than twice the width. What is the length of the rectangle in inches?

a.   11 inches
b.   22 inches
c.   25 inches
d.   36 inches
e.   none of the above

4. The test scores of one student are 79, 82, 83, 87, and 94. Find the mean of these scores.

a.   15
b.   83
c.   85
d.   94
e.   none of the above

5. Jeff wants to buy a computer that costs $1575. With a better disk drive, the cost of the computer will go up 8%. How much will an upgraded computer cost?

a. $1701
b. $1449
c. $1458.33
d. $1712
e.   none of the above

6. A and B are independent events. If $P(A) = \dfrac{5}{6}$ and $P(A \ and \ B) = \dfrac{1}{8}$, what is P(B)?

a. $\dfrac{1}{10}$

b. $\dfrac{3}{20}$

c. $\dfrac{1}{5}$

d. $\dfrac{1}{4}$

e. none of the above

7. Which of the following relations are functions?

I.

X	1	-1	2	1
Y	3	4	5	7

II.

X	1	2	3	4
Y	1	1	3	5

III.

X	0	1	2	3
Y	0	1	3	2

a. I
b. II
c. II and III
d. I, II, and III
e. none of the above

8. What is the value of $f(x) = \dfrac{-3}{x-1}$, for x = -1?

a. 2

b. $\dfrac{3}{2}$

c. Undefined

d. $-\dfrac{3}{2}$

e. none of the above

9. Which function is modeled by the table?

X	-1	1	3	5
Y	-5	-1	3	7

a. $y = 2x$

b. $y = 2x - 3$

c. $y = \dfrac{1}{2}x$

d. $y = \dfrac{1}{2}x + 3$

e. none of the above

10. Find the sixth term of the sequence 14, 9, 4, …

a. -13

b. -11

c. -1

d. 1

e. none of the above

11. A parachutist opens her parachute at 800ft. Her rate of change in altitude is – 30 ft/sec. Which of the following equations represents her altitude a in feet t seconds after she opens her parachute?

a. a = 30t

b. a = 800 – 30t

c. a = 800 + 30t

d. a = – 30t

e. none of the above

12. What is the slope of the line perpendicular to 3x + 2y = 7?

a. $-\dfrac{3}{2}$

b. $-\dfrac{2}{3}$

c. $\dfrac{2}{3}$

d. $\dfrac{3}{2}$

e. none of the above

13. What is true of the graphs of the two lines 3y – 8 = – 5x and 3x = 2y – 18?

a. no intersection
b. intersect at (2, – 6)
c. intersect at (– 2, 6)
d. indentical
e. none of the above

14. What is the solution to the system:
$$-2x - 3y = -15$$
$$3x + 2y = 0$$

a. $(-6, 9)$
b. $(-6, -9)$
c. $(6, -9)$
d. $(6, 9)$
e. none of the above

15. Which of the following points are solutions of $4y - 3x \le 8$?

I. $(0, 2)$ II. $\left(-3, \dfrac{1}{4}\right)$ III. $(5, 17.6)$ IV. $\left(-4, \dfrac{2}{5}\right)$

a. I only
b. IV only
c. II and IV
d. I and III
e. none of the above

16. Simplify $\left(2.5x10^4\right)\left(3.0x10^{-15}\right)$

a. $\left(7.5x10^{19}\right)$
b. $\left(7.5x10^{-19}\right)$
c. $\left(7.5x10^{11}\right)$
d. $\left(7.5x10^{-11}\right)$
e. none of the above

17. Each leg of a right isosceles triangle is 8 cm long. What is the length of the hypotenuse to the nearest tenth?

a. 27.7 cm
b. 16 cm
c. 13.9 cm
d. 11.3 cm
e. none of the above

18. Simplify: $-\left(-3x^2y\right)^3$

a. $27x^6y^3$
b. $-27x^5y^4$
c. $9x^5y^4$
d. $9x^6y^3$
e. none of the above

19. A baker can shape 2 loaves of bread in 5 minutes. How many loaves can the baker shape in an hour?

a. 120
b. 12
c. 60
d. 24
e. none of the above

20. Multiply $\dfrac{x-1}{x+3} \cdot \dfrac{x-3}{x^2-1}$

a. $\dfrac{x-1}{x^2-1}$

b. $\dfrac{x-3}{x^2+4x+3}$

c. $\dfrac{x-3}{x+3}$

d. $\dfrac{x-3}{x^2+2x-3}$

e. none of the above

21. How many solutions are there to the quadratic equation $2x^2+5x+1=0$

a. 0
b. 1
c. 2
d. infinitely many
e. none of the above

22. Simplify $\dfrac{20x^2y^4}{30x^5y^2}$

a. $\dfrac{4x^7y^6}{6}$

b. $\dfrac{2y^2}{3x^3}$

c. $\dfrac{3y^6}{2x^7}$

d. $\dfrac{2}{3}x^{10}y^8$

e. none of the above

23. Suppose you deposit $1000 in an account paying 5.5% interest, compounded annually. Which expression represents the value of the investment after 10 years?

a. $1000 \cdot 1.55^{10}$

b. $1000 \cdot 1.055^{10}$

c. $1000 \cdot 0.055^{10}$

d. $1000 \cdot 10^{1.055}$

e. none of the above

24. Find the solutions of $2x^2 + 5x + 3 = 0$

a. $\{-3, -1\}$

b. $\{-3. - 2\}$

c. $\left\{\dfrac{3}{2}, 1\right\}$

d. $\left\{-\dfrac{3}{2}, -1\right\}$

e. none of the above

25. A support wire from the top of a tower is 100 ft long. It is anchored at a spot 60 ft from the base of the tower. Find the height of the tower.

a. 160 ft

b. 80 ft

c. 40 ft

d. $4\sqrt{10}$ ft

e. none of the above

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Tie-Breaker #1

Serena bought a sweatshirt on sale for $32. The regular price was $42. What was the percent of decrease, to the nearest tenth of a percent?

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Tie-Breaker #2

A train leaves a station at 8:00 am and averages 40 mph. Another train leaves the same station one hour later and averages 50 mph traveling in the same direction on a parallel track. At what time will the second train catch up to the first train?

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Tie-Breaker #3

The perimeter of a rectangular lot is 74 feet. The cost of fencing along the two lengths is $1 per foot, and the cost of fencing along the two widths is $3.50 per foot. Find the dimensions of the lot if the total cost of the fencing is $159.

1. a
2. b
3. c
4. c
5. a
6. b
7. c
8. b
9. b
10. b
11. b
12. c
13. c
14. a
15. a
16. d
17. d
18. a
19. d
20. b
21. c
22. b
23. b
24. d
25. b

Tie Break #1: 24%

Tie Break #2: 1:00 pm

Tie Break #3: 20 ft x 17 ft