

GEORGIA SOUTHERN UNIVERSITY
HIGH SCHOOL MATHEMATICS TOURNAMENT
1995 JUNIOR HIGH WRITTEN EXAM

1. If $x = 3$ and $y = -4$, then evaluate $\frac{|3y - 5x - 1|}{-2|y - x|}$
- a. $-\frac{1}{2}$ b. 2 c. $\frac{2}{7}$ d. -2 e. $\frac{1}{2}$
2. Solve: $3x(x + 6) - x(3x - 7) = 25$
- a. $\frac{25}{13}$ b. 1 c. $\frac{5}{2}$ d. 5 e. $\frac{25}{11}$
3. Simplify: $\frac{3}{x - 1} - \frac{1}{4}$
- a. $\frac{13 - x}{4x - 4}$ b. $\frac{2}{x - 3}$ c. $\frac{2}{x - 5}$ d. $\frac{11 - x}{4(x - 1)}$
- e. can't determine
4. Evaluate: $\frac{2 + 4(|6 - 3 \cdot 2| - 3|-2|)}{1 + 2^3 \div 4 \cdot 5}$
- a. 0 b. $\frac{72}{11}$ c. -2 d. 26 e. $-\frac{6}{5}$
5. The sum of the ages of two children is 14. Two years ago the age of one child exceeded twice the age of the other child by one year. How old is the younger child?
- a. 6 b. 2 c. 7 d. 9 e. 5

6. Solve: $\left(\frac{n+1}{2}\right)^2 - \left(\frac{n-1}{2}\right)^2 = 8$

- a. 16 b. $\frac{15}{2}$ c. 4 d. 8 e. no solution

7. If the area of a particular circle is 254.8 meters squared, then its radius to the nearest meter is ? (Use $\pi = 3.14$)

- a. 8 b. 81 c. 41 d. 64 e. 9

8. A political candidate's election committee believes that the function

$$P(t) = \frac{46t}{t^2 + 15}$$

represents the percentage of the electorate

recognizing the candidate's name t weeks after the start of the campaign. What percentage, correct to the nearest hundredth, will recognize the candidate's name 3 weeks into the campaign?

- a. 6 b. 5.80 c. 5.7 d. 5.75 e. 6.57

9. Plain Drain Plumbing Company charges a flat fee of \$35 plus \$20 per hour. All Stops Plumbers, Inc. charges \$25 per hour. State the number of hours at which the cost of the two plumbing companies is the same.

- a. 9 hours b. 11 hours c. 7 hours d. never the same e. 5 hours

10. The population of a town is 25,000. If the population is growing at the rate of 1500 people per year, in how many years will the population be 31,750?

- a. 4.5 yrs. b. 21.2 yrs. c. 1.27 yrs. d. 5.4 yrs. e. 10.5 yrs.

11. What was the original price of a calculator, if a student bought it at a "25% off" sale and the sale price was \$12.

- a. \$15 b. \$28 c. \$21.60 d. \$48 e. \$16

12. Completely factor the following: $x^2y^2 - 16y^2 - 4x^2 + 64$

a. $y^2(x + 4)(x - 4) - 4(x + 4)(x - 4)$

b. prime

c. $y^2(x^2 - 16) - 4(x^2 + 16)$

d. $y^2(x + 4)(x - 4) - 4(x^2 + 16)$

e. $(x + 4)(x - 4)(y + 2)(y - 2)$

13. Solve: $3(2x - 1) < 8x - 7$

a. $x > 2$ b. $x < 2$ c. $x > 3$ d. $x < 3$ e. $x > 5$

14. Solve: $\frac{2y - 3}{3} + \frac{y + 1}{2} = 3$

a. $\frac{17}{3}$ b. $\frac{6}{7}$ c. 3 d. $\frac{12}{7}$ e. 12

15. Suppose from a monthly salary of \$2934, \$117.36 goes to medical insurance. What percent of the salary is paid for this insurance?

a. 40 b. 0.4 c. 25 d. 4 e. 0.04

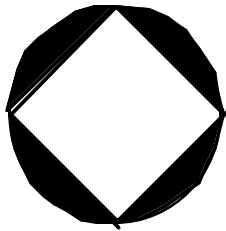
16. If $\frac{1}{10}\%$ of the population can get a rare type of flu, then how many people in 5,000 can catch this flu?

a. 5 b. 50 c. 500 d. 25 e. 250

17. Given: $R(x) = -x^2 - 2x + 1$, find $R(2b)$

- a. $-4b^2 - 4b + 1$ b. $4b^2 - 4b + 1$
c. $-4b^2x^2 - 4bx + 1$ d. $4b^2x^2 - 4bx + 1$
e. $2b^2 - 4b + 1$

18. A square is inscribed in a circle as pictured. The area of the shaded region in the circle below is $25\pi - 50$. What is the diameter of the circle?



- a. 5 b. $\sqrt{10}$ c. 25 d. $\sqrt{50}$ e. 10

19. On a freeway, two cars, starting at the same time from the same point, travel in the same direction. Assuming constant speeds, after 1.5 hours, how far ahead is the 60 mph car?

- a. 10 miles b. 15 miles c. 110 miles d. 75 miles e. 90 miles

20. Each vitamin C capsule contains 125 milligrams of vitamin C. How many capsules must one take to get 3.5 grams of vitamin C?

- a. 0.028 b. 437.5 c. 28 d. 35.7 e. 0.357

21. If $x + x + x = x + 10$, then $x = ?$

- a. 20 b. 10 c. 15 d. 5 e. 30

22. Which of the following is equal to 0.00238×10^2 ?

- a. 2.38 b. 0.238 c. 0.0238 d. 0.000238 e. 0.0000238

23. If $x \cdot y = \frac{x \cdot y}{z} + \frac{y \cdot z}{x} + \frac{z \cdot x}{y}$ for all
z

nonzero x, y, and z, then find $\frac{3}{4}$

4

- a. 1 b. 9 c. 10 d. 16 e. 26

24. In a 3-drawer chest, Sue has 30 percent of her sweaters in drawer A, 25 percent in drawer B, and the rest in drawer C. Assuming that Sue has some sweaters, what is the fewest number of sweaters she could have in drawer C?

- a. 1 b. 4 c. 9 d. 10 e. 20

25. If x, $\frac{1}{x}$, y, $\frac{1}{y}$, z, and $\frac{1}{z}$ are integers,

which of the following could not be a value
of $x + y + z$?

- a. 4 b. 3 c. 1 d. -1 e. -3

26. If the ratio of a to b is $\frac{7}{3}$, then the ratio of 2a to b is ?

- a. $\frac{7}{6}$ b. 2 c. $\frac{7}{3}$ d. 3 e. $\frac{14}{3}$

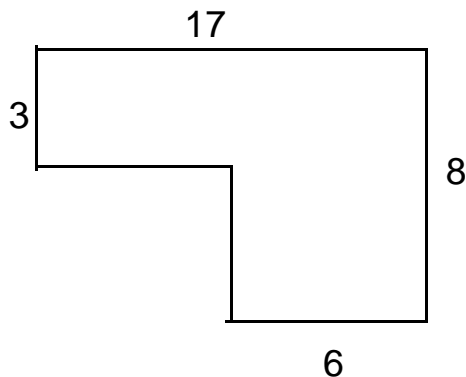
27. A 2-cup mixture consists of $\frac{1}{3}$ flour and $\frac{2}{3}$ corn-meal. If 1 cup of flour is added to make a 3-cup mixture, approximately what percent of the 3-cup mixture is flour?

- a. 65% b. 55% c. 50% d. 45% e. 35%

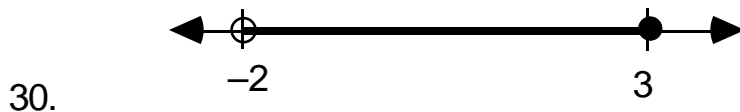
28. If the average of six numbers is -6 and the sum of four of the numbers is 20, what is the average of the other two numbers?

- a. 7 b. 8 c. -8 d. -28 e. -32

29. Find the area of the figure below. (Assume that all angles are right angles)



- a. 50 b. 81 c. 99 d. 154 e. 34



Which inequality is represented by the graph above?

- a. $-2 < x \leq 3$ b. $2 < x < 3$ c. $2 < x = 3$ d. $2 > x > 3$ e. $-2 > x \leq 3$

31. A woman purchases 4 pounds of peanuts priced at \$0.80 per pound. How much change does she receive from a \$10 bill?

- a. \$3.20 b. \$7.20 c. \$7.80 d. \$6.80 e. \$9.20

32. The cost of purchasing and mailing party invitations was \$16.50. If the cards were purchased at 3 for \$0.84 and each required a \$0.22 stamp, how many cards were purchased?
- a. 11 b. 22 c. 33 d. 66 e. 99
33. What is the largest composite odd factor of 168?
- a. 41 b. 7 c. 8 d. 21 e. 24
34. If the integer 50 is the third integer of five consecutive integers, then the sum of these integers is ?
- a. 25 b. 200 c. 230 d. 250 e. can't determine
35. The product xy is constant and $x = 4$ when $y = 7$. What is the value of x when $y = 17\frac{1}{2}$?
- a. 1.6 b. 2.8 c. 4.8 d. 10 e. 16
36. A man traveled 24 miles north and then 10 miles east. What is the shortest distance to his starting point?
- a. 21.8 miles b. 26 miles c. 120 miles d. 34 miles e. 24 miles
37. Each of the equal angles of an isosceles triangle is 15 degrees more than twice the vertex angle. Find the measure of the vertex angle.
- a. 75° b. 30° c. 41.25° d. 60° e. 82.5°
38. Which value of y will make the fraction $\frac{y + 2}{y - 5}$ meaningless?
- a. 5 b. 2 c. -2 d. -5 e. both a and c

39. A test was failed by 15% of the class. If 6 students failed, how many students were in the class?
- a. 90 b. 51 c. 40 d. 14 e. 25
40. If the set $A = \{1, 2, 3\}$, how many subsets can be formed from set A?
- a. 3 b. 8 c. 6 d. 7 e. 9

Answer Key to Written Exam 1995

1. D	21. D
2. B	22. B
3. A	23. E
4. C	24. C
5. E	25. A

6. D	26. E
7. E	27. B
8. D	28. D
9. C	29. B
10. A	30. A

11. E	31. D
12. E	32. C
13. A	33. D
14. C	34. D
15. D	35. A

16. A	36. B
17. A	37. B
18. E	38. A
19. B	39. C
20. C	40. B