GEORGIA SOUTHERN UNIVERSITY
HIGH SCHOOL MATHEMATICS TOURNAMENT
1998 JUNIOR HIGH WRITTEN EXAM

1. Which of the following is **not** a natural number?

   a) 5
   b) 7
   c) 0
   d) 9
   e) 2

2. Which of the following **can be** sides of a right triangle?

   a) 5,7,10
   b) 11,60,61
   c) 7,24,26
   d) 3,4,6
   e) 1,2,3

3. The wheel of a bicycle is 28 inches in diameter. How many feet will be covered in 9 turns of the wheel? (Use $\pi = \frac{22}{7}$)

   a) 21
   b) 66
   c) 462
   d) 792
   e) 252

4. Which of the following statements is false?

   a) $6 < 8$
   b) $4 \geq 4$
   c) $11 > 9$
   d) $20 > 0$
   e) $4 \leq 3$

5. Subtract $\left(2x^2 - 3x + 1\right)$ from $\left(3x^3 - 4x^2 + 2x - 7\right)$

a) $3x^3 - 6x^2 + 5x - 8$

b) $-3x^3 + 6x^2 - 5x + 8$

c) $3x^3 - 6x^2 - x - 6$

d) $-3x^3 + 6x^2 + x + 6$

e) $-3x^3 + 6x^2 - x + 6$

6. If the outer diameter of an iron pipe with uniform thickness is 14.38 inches and the inner diameter is 12.50 inches, what is the thickness of the pipe?

a) 0.94 inches
b) 1.88 inches
c) 16.88 inches
d) 26.88 inches
e) 2.88 inches

7. In which quadrant of the Cartesian Coordinate System is the point $(-1, 3)$ located?

a) I
b) II
c) III
d) IV
e) V

8. Find the slope of a line formed by the equation $x + 2y = 4$.

a) 1
b) $\frac{1}{2}$
c) -2
d) $-\frac{1}{2}$
e) -1

9. Simplify: $\sqrt{36x^9}$

a) $6x^4\sqrt{x}$
b) $6x^3$
c) $18x^4\sqrt{x}$
d) $6x\sqrt{x}$
e) $6x^4\sqrt{x^5}$

10. Solve: $3(2x-1)-2(x+3)=6(x-1)$

a) $\frac{-2}{3}$
b) 2
c) $\frac{3}{10}$
d) -4
e) $\frac{-3}{2}$

11. Simplify: $2 + 3^2(4 - 3 \bullet 5)$

a) 55
b) 47
c) -88
d) -77
e) -97

12. Find the area of a triangle whose base is 8 inches and height is 4 inches.

a) 12 sq. in.
b) 32 sq. in.
c) 16 sq. in.
d) 4 sq. in.
e) 80 sq. in.

13. Which of the following numbers is **not** divisible by 3?

a) 201
b) 87
c) 1242
d) 503
e) 750

14. Find the sum of all prime numbers less than or equal to 25.

a) 26
b) 100
c) 101
d) 25
e) can't determine

15. How many meters are in $\frac{1}{250}$ kilometers?
(use 1 kilometer = 1000 meters)

a) 40
b) 25
c) 0.25
d) 4.0
e) 250,000

16. In her math class Betsy knows that 75% of her final course grade is based on her test average before the final exam. The remainder of her course grade is based on the score that she receives on the final exam in the class. If Betsy has an 83 test average before the final exam, what grade on the final exam does she need in order to have a final course grade of 80?

a) 82
b) 79
c) 77
d) 80
e) 71

17. A car travels 140 miles in 2 hours, while the return trip takes $1\frac{1}{2}$ hours. What is the average speed in miles per hour for the entire trip?

a) 35
b) $37\ \frac{1}{2}$
c) 80
d) 40
e) 75

18. Seth purchased three shirts for $20.50 each. The sales tax rate in his hometown is 6%. How much change did Seth receive if he gave the salesperson a $100 bill?

a) $21.73
b) $34.81
c) $78.27
d) $38.50
e) $65.19

19. Simplify: $2^3 \bullet 2^5$

a) 2^8
b) 4^8
c) 4^{15}
d) 2^{15}
e) 2^2

20. 9^3 is equivalent to

a) 3^9
b) 6^6
c) 3^6
d) 3^3
e) 12

21. If $3 \otimes 4 = 3^4 - 4^3 = 17$, then find $2 \otimes 5$

a) 57
b) 17
c) -7
d) -109
e) 7

22. If 4 men working 6 hours a day paint a house in 5 days, then how many men would be needed to paint the same house working 8 hours a day for 3 days.

a) 5
b) 3
c) 4
d) 6
e) 2

23. An aquarium measuring 3 feet long by 2 feet wide by 2 feet tall is filled with water 6 inches from the top. The ratio of the volume of the aquarium not filled with water to that which is filled with water is

a) 1:4
b) 3:4
c) 3:1
d) 1:3
e) 2:3

24. A square 18 feet on one side has the same area as a rectangle which has a width of 9 feet. What is the length of the rectangle?

a) 9 feet
b) 2 feet
c) 27 feet
d) 36 feet
e) can't determine

25. Simplify: $\dfrac{\frac{2}{5}-\frac{1}{2}}{\frac{3}{4}-\frac{2}{3}}$

a) $\frac{1}{3}$

b) $-\frac{6}{5}$

c) $-\frac{1}{5}$

d) $\frac{6}{5}$

e) $-\frac{5}{6}$

26. If $x=2$ and $y=-5$, find $\dfrac{|4y+3x-1|}{-3|y+2x|}$

a) $-\frac{1}{3}$

b) -1

c) 1

d) -5

e) 5

27. Solve: $2(3x+1)<8x-6$

a) $x<\frac{7}{2}$

b) $x>4$

c) $x>-\frac{5}{14}$

d) $x>\frac{5}{2}$

e) $x<-\frac{1}{2}$

28. If the ratio of x to y is $\frac{3}{11}$, what is the ratio of x to 2y?

a) $\frac{6}{11}$
b) $\frac{3}{13}$
c) $\frac{1}{2}$
d) $\frac{3}{22}$
e) $\frac{1}{22}$

29. Suppose that 15% of a class failed the course. If 9 students failed, how many were in the class?

a) 30
b) 45
c) 90
d) 135
e) 60

30. Evaluate: $2|5-9|+3\bullet 5^2+\frac{\sqrt{16}}{4}-8$

a) 60
b) 76
c) 268
d) 198
e) 92

31. Find the next number in the following series; 3, 5, 11, 29...

a) 83
b) 41
c) 47
d) 65
e) 57

32. Simplify: $\frac{5}{6} - \left(\frac{2}{3}\right)^2 \div \left(\frac{1}{2} - \frac{1}{3}\right)$

a) $\frac{-19}{6}$
b) $\frac{7}{3}$
c) 1
d) $\frac{7}{54}$
e) $\frac{-11}{6}$

33. A boy travels on his bicycle at the rate of 7 miles per hour and his sister on hers at the rate of 5 miles per hour. They start at the same time and place and travel over the same road in the same direction. After traveling for 3 hours the boy turns back. How far from the starting point has his sister traveled when they meet?

a) 18 miles
b) 17.5 miles
c) 21 miles
d) 24 miles
e) 15.6 miles

34. The annual income of a family is budgeted as follows; $\frac{1}{10}$ for clothing, $\frac{1}{3}$ for food and $\frac{1}{5}$ for rent. This leaves \$13,200 for other expenses and savings. Find the annual income of the family.

a) \$21,560
b) \$36,000
c) \$237,600
d) \$396,000
e) \$215,600

35. A lawn mower was advertised for $175.75. Mr. Smith paid $50 down and $25 per month for 6 months for this lawn mower. How much more than the advertised price did he pay?

a) $274.25
b) $200
c) $124.25
d) $24.25
e) $74.25

36. A store offers a small camera for $72 instead of the original price of $90. What is the rate of discount for this camera?

a) 2%
b) 5%
c) 18%
d) 20%
e) 25%

37. A coffee shop blends two kinds of coffee, putting in 2 parts of the $0.33 a pound grade to 1 part of the $0.24 a pound grade. If the mixture is changed to 1 part of the $0.33 a pound grade and 2 parts of the $0.24 a pound grade, how much will the shop save if 100 pounds are blended?

a) $1
b) $0.90
c) $3
d) $9
e) $0.30

38. Peter enters an elevator. He takes the elevator down 5 floors, then up 6 floors and finally, down 7 floors. He arrives on the 2nd floor. What floor did Peter initially enter the elevator ?

a) 10
b) 8
c) 11
d) 9
e) can't determine

39. A pound of water is evaporated from 6 pounds of salt water containing 4% salt. Find the percentage of salt in the remaining salt water.

a) $3\frac{1}{3}\%$
b) $4\frac{4}{5}\%$
c) 4%
d) $5\frac{4}{5}\%$
e) 3%

40. The difference when fifteen is subtracted from three times a number is twenty-seven. Find the number.

a) 14
b) 4
c) -14
d) -4
e) 105

Junior High Division
1998 Written Exam
Answer Key

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