CALIFORNIA STATE UNIVERSITY, BAKERSFIELD
Lee Webb Math Field Day 2019
Individual Medley, Freshman- Sophomore Level

Your answers to these questions should be on the side of the answer sheet that has answer spaces 1, 2, 3, 4, 5 (NOT A, B, C, D, E). On the answer sheet you should write your name, school name, level (Freshman-Sophomore), and Division (your proctor should have a list of which schools are in which divisions).

For each of the following questions, blacken the appropriate circle on the answer sheet. Each correct answer is worth four points. **One point is deducted for each incorrect answer.** An unanswered question is given zero points. Note that random guessing may adversely affect your score.

You have 50 minutes to complete the examination. If you finish early, review your answers. When the exam is over, give your answer sheet to the proctor.

All calculators, cell phones, music players, and other electronic devices should be put away in backpacks, purses, pockets, etc. Leaving early or otherwise disrupting other contestants may be cause for disqualification.

1. What is the y-intercept of the perpendicular bisector of the segment that connects (6,0) and (0,8)?

1. 1 2. 2 3. 3/2
4. 5/3 5. 7/4

2. How many ways can the letters in MATHDAY be rearranged?

1. 720 2. 1440 3. 2520
4. 3220 5. 6440

3. Gerry gave away half his marbles to Jim. Then Gerry gave one third of the remaining marbles to Ben. Then Gerry gave one fourth of the remaining marbles to Jen. At this point, Gerry had 6 marbles left. How many marbles did Jim get?

1. 4 2. 6 3. 8
4. 12 5. 16

4. A line with positive slope intersects the x-axis at an angle of 60 degrees. What is the slope of the line?

1. 2 2. $\sqrt{2}$ 3. $\frac{\sqrt{3}}{2}$
4. $\sqrt{3}$ 5. 60

5. How many distinct solutions does the equation $3x^4+3x^2=6x^3$ have?

1. 0 2. 1 3. 2
4. 3 5. 4

6. Mrs. Weierstrass's class had 3 boys and 7 girls volunteer to be on the student council. From this group of 10 students, 2 will be chosen randomly. What is the probability that one boy and one girl will be the representatives?

1. 3/8 2. 5/12 3. 3/7
4. 7/15 5. 7/30

7. A four-ply napkin is folded in half five times. How many layers are there now?

1. 9 2. 20 3. 64
4. 120 5. 128

8. Suppose $f(x)=\frac{x-4a}{2x+b}$ and $f(1/4)=0$ and $f(6)$ is undefined. What is $f(8)$?

1. 31/16 2. 23/13 3. 17/9
4. 43/17 5. 43/24

9. In triangle ABC, we have side lengths AB=3, BC =2, and CA =4. D is on AB such that CD bisects the angle at C. What is the length of BD?

1. 1 2. 7/9 3. 2
4. 9/7 5. 1.5

10. In Mis Meanor's class there are 32 students. Twenty of them are in the Math Club. Fifteen students are in the Geology Club. Five students are not in either club. How many are in both clubs?

1. 8 2. 12 3. 15
4. 16 5. 17

11. Thirty-two table tennis players enter a single-elimination tournament. The pairings are arranged randomly. What is the probability that the second best player will play in the final match?

1. 1/2
2. 1/3
3. 2/3
4. 17/32
5. 16/31

12. Triangle ABC has BC=14 and AB=AC = 25. D is on AC and BD is perpendicular to AC. Which of the following is the closest to the length of BD?

1. 12.89
2. 13.06
3. 13.44
4. 14.81
5. 14.88

13. Suppose $(x+5)^2-(x-5)^2=(y+10)^2-(y-10)^2$. If $y=23$, what is x ?

1. 23
2. 27
3. 37
4. 46
5. 50

14. What is the area of the triangle with vertices at (2,4), (4,3), and (7, 10).

1. 8
2. 10
3. 12
4. 8.5
5. 10.5

15. Suppose $nx+12=5n$. For how many integer values of n is x also an integer?

1. 0
2. 1
3. 6
4. 10
5. 12

16. Triangle A has vertices at (-1,0), (3,0) and (1,4). Triangle A' is obtained by reflecting A around the y-axis. What is the enclosed area of the union of A and A'?

1. 9
2. 10
3. 14
4. 16
5. 20

17. If all the numbers 1, 2, 3, …, 1000 are written out, how many times will the digit 7 appear?

1. 180
2. 200
3. 269
4. 271
5. 300

18. The arrow on a spinner is pointing directly North. Each time it is flicked, it goes clockwise 50 degrees. How many flicks will it take before it is pointing directly North again?

1. 7
2. 17
3. 24
4. 30
5. 36

19. Xu and Mario work together for 10 hours to complete their daily task. On the next day they work together for 6 hours and then Xu has to leave town. Mario finishes by himself in 6 more hours. On the next Mario has to do the whole task by himself. How many hours will it take?

1. 14
2. 14.5
3. 15
4. 24
5. 60

20. What is the distance between the lines $2y-x=5$ and $2y-x+1=0$?

1. $\sqrt{10}$
2. 3
3. $6\sqrt{5}/5$
4. $12\sqrt{3}/3$
5. 4

21. Square ABCD has side length 4. Points E and F are on AB and BC, respectively and both E and F are 1 unit away from B. Diagonal AC intersects DE and DF at G and H. What is the area of EBFHG?

1. 18/7
2. 20/7
3. 24/13
4. 22/5
5. 120/17

22. Peter, Paul, and Mary together ate 6 sugar cookies. Each of them ate at least one cookie. How many ways could this have happened?

1. 6
2. 9
3. 10
4. 12
5. 18

23. Four fifths of the students in a class are sitting in three quarters of the chairs (with no sharing of chairs). The rest of them are dancing. Eight chairs are vacant. How many students are in the class?

1. 12
2. 18
3. 24
4. 30
5. 36

24. What is the tens digit of 7^{2019} ?

1. 0
2. 4
3. 7
4. 8
5. 9

25. What is the next number in this sequence: 6, 42, 7, 12, 48, 16, 18, __ (Note – this problem comes from a 1960's Florida College Prep Exam)?

1. 54
2. 36
3. 24
4. 18
5. 9