

2016 MATH FIELD DAY

MENTAL ARITHMETIC

No Calculators

No Pencil/Paper Computations

There are 20 questions on the test. Each one will be flashed on the screen for 25 seconds and read aloud. At the end of this time, the monitor will say, “Write down your answer.” At this time you may pick up your pencil and write your answer. Then put your pencil back down. If you fail to put your pencil down when asked, you risk not having your paper scored. The first 15 problems are multiple choice. Be sure to write A, B, C, or D, not a number. The last 5 problems require a number answer or an algebraic expression.

1. What is the correct answer to 97×103 ?

A. 10009

B. 10000

C. 9891

D. 9991

2. Which pair of numbers are both primes ('twin primes')?

A. (91, 93)

B. (109, 111)

C. (137, 139)

D. (149, 150)

3. What is the correct answer for $\frac{49^2 - 36^2}{85}$?

- A. 13/85
- B. 13
- C. 169/85
- D. 85

4. Take 80% of 90, then add 10% of that value to itself, and then add 10% of that value to itself. What do you get?

- A. 86.40
- B. 96.80
- C. 87.12
- D. 90

5. Which of these numbers could not possibly be 7^{100} ? A number ending in:

- A. 1
- B. 3
- C. 7
- D. 5

6. What is the sum of $2+4+6+8+\dots+196+198+200$?

A. 400

B. 1010

C. 20200

D. 10100

7. Which number is prime?

A. 213

B. 2001

C. 171

D. 401

8. Compute $2\frac{1}{4} - ? = \frac{7}{8}$

A. $5\frac{3}{8}$

B. 4

C. $4\frac{3}{8}$

D. $4\frac{3}{4}$

9. Take 30% off of the quotient of 30 and the reciprocal of 30. The result is:

- A. 630**
- B. 27**
- C. 63**
- D. 270**

10. Which number is evenly divisible by both 4 and 6?

A. 12345

B. 123456

C. 1234567

D. 12345678

11. Evaluate the expression when $a = -1$ and $b = -2$:

$$a - b^{a-b}$$

A. $-1/27$

B. 1

C. $-1/2$

D. $1/2$

12. What is the number of times the hour hand, minute hand, and second hand go around in 2 days?

- A. 1440**
- B. 2880**
- C. 1466**
- D. 2932**

13. Select the one non-square number:

A. 5184

B. 4900

C. 5328

D. 5041

14. Which pair of numbers has a GCF of 1?

A. (111, 135)

B. (21, 91)

C. (107, 107)

D. (103, 108)

15. Find the answer to “One fourth of 500; less 75; divided by 4; times 5”.

A. 64.25

B. 62.5

C. 17.5

D. 12.5

16. Add $123,456,789 + 987,654,321 + 123,456,789 + 987,654,321 + 2$. The answer is _____.

17. Add all the interior angle measures in a pentagon, rectangle, and triangle. Divide that sum by the sum of the number of faces of a cube and tetrahedron. The result is

_____.

18. Add the digits of your age together; multiply by 9; add 3; add the digits of the result; divide by 4; multiply by 10,000. The final answer is _____.

19. Find the product

$$\frac{(\sqrt{ab})(\sqrt{bc})(\sqrt{a}-\sqrt{b})(\sqrt{a}+\sqrt{b})}{\sqrt{abc}}$$

20. What is the largest integer n for which $4^n < n^4$?