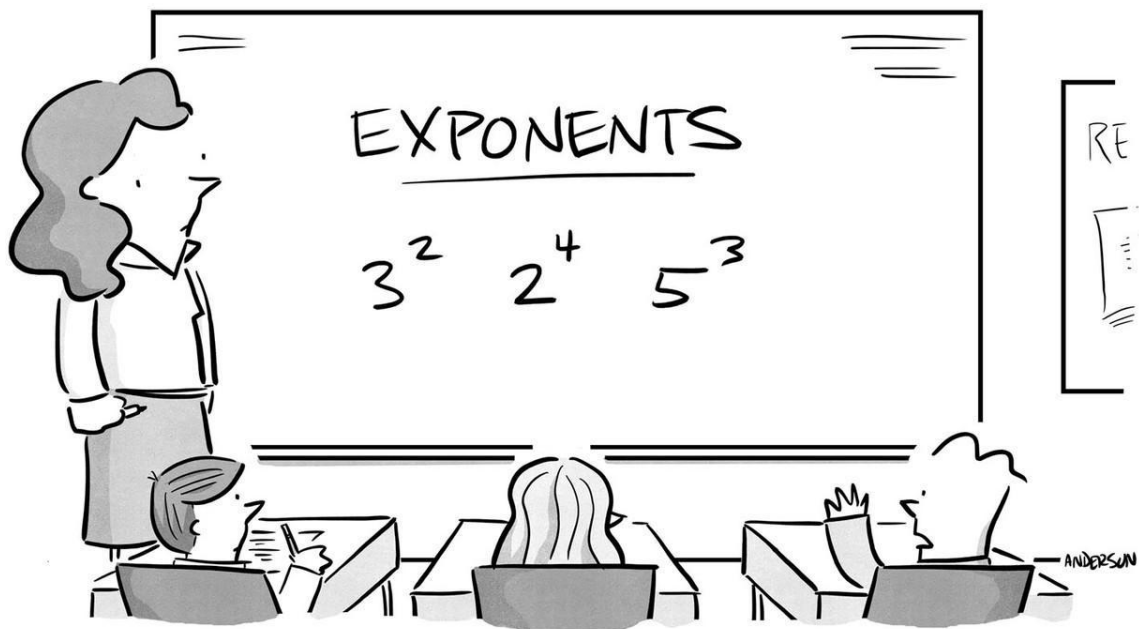


Fourteenth Annual PI Competition

Math II Individual Test

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"Why did they quit being ponents?"

YOU WILL HAVE 60 MINUTES TO COMPLETE THIS TEST. THERE ARE 30 MULTIPLE CHOICE QUESTIONS. MARK YOUR ANSWER ON THE ANSWER SHEET. NO AIDS SUCH AS CALCULATORS, NOTES, BOOKS, ETC., MAY BE USED IN COMPLETING THIS TEST. ALL FRACTIONS MUST BE IN SIMPLEST FORM. **THE CHOICE E. NOTA, DENOTES “NONE OF THE ABOVE.” IF NONE OF THE ANSWERS ARE CORRECT, CHOOSE E.**

WATCH OUT FOR SILLY MISTAKES. REMEMBER THAT THESE QUESTIONS ARE MEANT TO BE CHALLENGING FOR EVEN THE TOP STUDENTS.

GOOD LUCK AND HAVE FUN!

1. A plank that is 6 feet long is cut into two pieces, and one of the pieces is x feet long.

Represent the length of the second piece.

A. $x + 6$ B. $6 - x$ C. $x - 6$ D. $6x/2$ E. NOTA

2. Solve the following equation if $x=4$, $y=5$, and $z=3$. $3xy + x^2 + yz$

A. 93 B. 94 C. 91 D. 90 E. NOTA

3. Simplify the following expression: $18h + 5(5w - 4x)$

A. $18h + 25w - x$ B. $18h + 25w - 20x$ C. $18h + 10w - x$

B. D. $18h + 10w + 20x$ E. NOTA

4. Solve the equation for x : $ax + 9a = 6a$

A. 3 B. -3 C. 2 D. -2 E. NOTA

5. One number is 40% less than another number. Their difference is 100. What are the two numbers?
- A. 300 and 180 B. 250 and 180 C. 300 and 150 D. 300 and 400 E. NOTA
6. Find the sum of these expressions. $(5x^3 - 4x^2 - x) + (2x^4 - 2x^3 - 9x + 4)$
- A. $2x^4 - 3x^3 - 4x^2 - 10x + 4$ B. $2x^4 + 3x^3 + 4x^2 - 10x + 4$ C. $2x^4 - 3x^3 - 4x^2 - 10x + 4$
D. $2x^4 + 3x^3 - 4x^2 - 10x + 4$ E. NOTA
7. Julia can clean her house in 5 hours. Her sister takes seven hours to do the same job. If they clean the house together, how long will it take them?
- A. $\frac{7}{5}$ hours B. $\frac{37}{12}$ hours C. $\frac{35}{12}$ hours D. $\frac{5}{7}$ hours E. NOTA
8. On a map, $\frac{3}{4}$ inches represents 8 miles. How many miles does $\frac{9}{2}$ inches represent on the same map?
- A. 48 miles B. 36 miles C. 32 miles D. 52 miles E. NOTA
9. Kaylee shot rounds of 80, 78, 85, and 76 on the first four days of the golf tournament. What score must she shoot on the fifth day to average at least 79 for the five days?
- A. 72 B. 84 C. 80 D. 76 E. NOTA
10. If a number is subtracted from both terms of the ratio 34:18, the result is equal to the ratio 7:3. What is the number?
- A. 8 B. 5 C. 7 D. 6 E. NOTA
11. The written portion of Dat's driving test had 38 questions. Dat correctly answered 14 more questions than he missed. How many questions did Dat answer correctly?
- A. 12 B. 24 C. 14 D. 28 E. NOTA
12. The physics class of 36 students has 12 boys. What is the percentage of girls in the class?
- A. 60% B. 62% C. 67% D. 69% E. NOTA

13. Solve the following equation: $6x^2 + 2x - 4 = 0$

- A. $-1, \frac{2}{3}$ B. $1, \frac{1}{3}$ C. $2, \frac{2}{3}$ D. $-1, \frac{1}{3}$ E. NOTA

14. The average of 3 numbers is 21, and the smallest of these numbers is 3. If the remaining two numbers are equal, what are their values?

- A. 22 B. 23 C. 30 D. 33 E. NOTA

15. If $3x^2 = 147$, what would the value of $3x^4$ be?

- A. 2,401 B. 16,807 C. 7,203 D. 50,421 E. NOTA

16. What is the y-intercept of the line with the equation $4x + 5y = 12$

- A. 3 B. $\frac{3}{5}$ C. 12 D. $\frac{12}{5}$ E. NOTA

17. What is the slope for the following points? $(-2, 19)$, $(21, 15)$

- A. $\frac{19}{4}$ B. $\frac{4}{19}$ C. $-\frac{23}{4}$ D. $-\frac{4}{23}$ E. NOTA

18. Natalie has a chiffon cake recipe that calls for both eggs and cups of flour. She is able to purchase six eggs and four cups of flour for \$5.21 and four eggs and eight cups of flour for \$6.42. Based on these costs, what is the cost of the ten eggs that Natalie will need for this recipe?

- A. \$5.00 B. \$5.50 C. \$4.00 D. \$4.50 E. NOTA

19. Before her party, Diana goes to buy water bottles for her guests. Each water bottle contains 24 ounces of water. If there are 30 guests invited and each guest drinks 1 cup of water, how many water bottles does Diana need to buy? (16 ounces = 2 cups)

- A. 5 bottles B. 10 bottles C. 15 bottles D. 20 bottles E. NOTA

20. What is the volume of a rectangular prism with a length of 7, a width of 8, and a height of 2?
- A. 100 B. 112 C. 56 D. 116 E. NOTA
21. A plane company can produce a particular model plane one at a time in a factory. If it takes the company a total of 1440 minutes to produce one single plane, how many planes will it produce in that particular factory in 552 hours?
- A. 21 planes B. 20 planes C. 22 planes D. 23 planes E. NOTA
22. A team of scientists is tracking a snail moving at a rate of 750 millimeters per minute. At what rate would the snail move in centimeters per hour?
- A. 4200 B. 45000 C. 42000 D. 4500 E. NOTA
23. Matthew and Charles purchase a bicycle for \$450. If the amount Matthew paid was \$40 less than three times the amount Charles paid, how much, in dollars, did Matthew pay?
- A. \$327.50 B. \$122.00 C. \$152.50 D. \$327.00 E. NOTA
24. Solve for x: $\frac{3}{x} = \frac{5}{8}$
- A. $\frac{15}{8}$ B. $\frac{24}{5}$ C. $\frac{5}{24}$ D. $\frac{8}{15}$ E. NOTA
25. Evaluate $\frac{2^5 3^4}{2^2 3^3}$
- A. 3.33 B. 12 C. 24 D. 6 E. NOTA
26. Timmy went to the grocery store to buy some fruit. He spent $\frac{1}{3}$ of his money on bananas and $\frac{1}{4}$ of the remaining money on apples. He had \$12 left. How much money did he initially have?
- A. \$144 B. \$16 C. \$8 D. \$24 E. NOTA

27. Sylvester has 342 magic pebbles. The ratio of green to blue to orange to red pebbles is 3:2:3:1. How many orange pebbles does he have?

- A. 38 B. 76 C. 92 D. 152 E. NOTA

28. What value of z in the following equation allows x to have infinitely many solutions?

$$z(x - 7) = 4(x - 7)$$

- A. 7 B. 8 C. 4 D. $1/2$ E. NOTA

29. How many sides does a pentadecagon have?

- A. 10 B. 12 C. 15 D. 17 E. NOTA

30. Congratulations! You have reached the last question. My clock reads 2:30. In 2 hours and 15 minutes, how many degrees will the angle of the minute hand be between the original time and the new time?

- A. 90° B. 45° C. 135° D. 160° E. NOTA