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ALGEBRA WORD PROBLEMS

2004B 1. Each row of the Misty Moon Amphitheater has 33 seats. Rows 12 through 22 are reserved for a youth club. How many seats are reserved for this club?

(A) 297 **(B)** 330 **(C)** 363 **(D)** 396 **(E)** 726

2006A 1. Sandwiches at Joe's Fast Food cost \$3 each and sodas cost \$2 each. How many dollars will it cost to purchase 5 sandwiches and 8 sodas?

(A) 31 **(B)** 32 **(C)** 33 **(D)** 34 **(E)** 35

2017B 1. Mary thought of a positive two-digit number. She multiplied it by 3 and added 11. Then she switched the digits of the result, obtaining a number between 71 and 75, inclusive. What was Mary's number?

(A) 11 **(B)** 12 **(C)** 13 **(D)** 14 **(E)** 15

2001

2. A number x is 2 more than the product of its reciprocal and its additive inverse. In which interval does the number lie?

(A) $-4 \leq x \leq -2$ **(B)** $-2 < x \leq 0$ **(C)** $0 < x \leq 2$

(D) $2 < x \leq 4$ **(E)** $4 < x \leq 6$

2003B

3. The sum of 5 consecutive even integers is 4 less than the sum of the first 8 consecutive odd counting numbers. What is the smallest of the even integers?

(A) 6 **(B)** 8 **(C)** 10 **(D)** 12 **(E)** 14

2002A

3. According to the standard convention for exponentiation,

$$2^{2^{2^2}} = 2^{\left(2^{(2^2)}\right)} = 2^{16} = 65,536.$$

If the order in which the exponentiations are performed is changed, how many other values are possible?

(A) 0 **(B)** 1 **(C)** 2 **(D)** 3 **(E)** 4

2012A

3. A bug crawls along a number line, starting at -2. It crawls to -6, then turns around and crawls to 5. How many units does the bug crawl altogether?

(A) 9 **(B)** 11 **(C)** 13 **(D)** 14 **(E)** 15

2002A

4. For how many positive integers m does there exist at least one positive integer n such that $m \cdot n \leq m + n$?

(A) 4 **(B)** 6 **(C)** 9 **(D)** 12 **(E)** infinitely many

2013B

4. When counting from 3 to 201, 53 is the 51^{st} number counted. When counting backwards from 201 to 3, 53 is the n^{th} number counted. What is n?

(A) 146 **(B)** 147 **(C)** 148 **(D)** 149 **(E)** 150

2014B

4. Susie pays for 4 muffins and 3 bananas. Calvin spends twice as much paying for 2 muffins and 16 bananas. A muffin is how many times as expensive as a banana?

(A) $\frac{3}{2}$ **(B)** $\frac{5}{3}$ **(C)** $\frac{7}{4}$ **(D)** 2 **(E)** $\frac{13}{4}$

2016A

4. The remainder function can be defined for all real numbers x and y with $y \neq 0$ by

$$\text{rem}(x, y) = x - y \left\lfloor \frac{x}{y} \right\rfloor,$$

where $\left\lfloor \frac{x}{y} \right\rfloor$ denotes the greatest integer less than or equal to $\frac{x}{y}$. What is the value of $\text{rem}\left(\frac{3}{8}, -\frac{2}{5}\right)$?

(A) $-\frac{3}{8}$ **(B)** $-\frac{1}{40}$ **(C)** 0 **(D)** $\frac{3}{8}$ **(E)** $\frac{31}{40}$

2017A

4. Mia is "helping" her mom pick up 30 toys that are strewn on the floor. Mia's mom manages to put 3 toys into the toy box every 30 seconds, but each time immediately after those 30 seconds have elapsed, Mia takes 2 toys out of the box. How much time, in minutes, will it take Mia and her mom to put all 30 toys into the box for the first time?

(A) 13.5 **(B)** 14 **(C)** 14.5 **(D)** 15 **(E)** 15.5

2018B

5. How many subsets of $\{2, 3, 4, 5, 6, 7, 8, 9\}$ contain at least one prime number?

(A) 128 **(B)** 192 **(C)** 224 **(D)** 240 **(E)** 256

2017A

5. The sum of two nonzero real numbers is 4 times their product. What is the sum of the reciprocals of the two numbers?

(A) 1 **(B)** 2 **(C)** 4 **(D)** 8 **(E)** 12

2011B

5. In multiplying two positive integers a and b, Ron reversed the digits of the two-digit number a. His erroneous product was 161. What is the correct value of the product of a and b?

(A) 116 **(B)** 161 **(C)** 204 **(D)** 214 **(E)** 224

2013B

5. Positive integers a and b are each less than 6. What is the smallest possible value for $2 \cdot a - a \cdot b$?

(A) -20 **(B)** -15 **(C)** -10 **(D)** 0 **(E)** 2

2001

3. The sum of two numbers is S. Suppose 3 is added to each number and then each of the resulting numbers is doubled. What is the sum of the final two numbers?

(A) $2S+3$ **(B)** $3S+2$ **(C)** $3S+6$ **(D)** $2S+6$ **(E)** $2S+12$

2008A

3. For the positive integer n, let $<n>$ denote the sum of all the positive divisors of n with the exception of n itself. For example, $<4> = 1+2 = 3$ and $<12> = 1+2+3+4+6 = 16$. What is $<<<6>>>$?

(A) 6 **(B)** 12 **(C)** 24 **(D)** 32 **(E)** 36

2010A

3. Tyrone had 97 marbles and Eric had 11 marbles. Tyrone then gave some of his marbles to Eric so that Tyrone ended with twice as many marbles as Eric. How many marbles did Tyrone give to Eric?

(A) 3 **(B)** 13 **(C)** 18 **(D)** 25 **(E)** 29

2015B

3. Isaac has written down one integer two times and another integer three times. The sum of the five numbers is 100, and one of the numbers is 28. What is the other number?

(A) 8 **(B)** 11 **(C)** 14 **(D)** 15 **(E)** 18

2017B

3. Real numbers x, y, and z satisfy the inequalities

$$0 < x < 1, \qquad -1 < y < 0, \qquad \text{and} \qquad 1 < z < 2.$$

Which of the following numbers is necessarily positive?

(A) $y + x^2$ **(B)** $y + xz$ **(C)** $y + y^2$ **(D)** $y + 2y^2$

(E) $y + z$

2007A

4. The larger of two consecutive odd integers is three times the smaller. What is their sum?

(A) 4 **(B)** 8 **(C)** 12 **(D)** 16 **(E)** 20

2013A

5. Tom, Dorothy, and Sammy went on a vacation and agreed to split the costs evenly. During their trip Tom paid \$105, Dorothy paid \$125, and Sammy paid \$175. In order to share the costs equally, Tom gave Sammy t dollars, and Dorothy gave Sammy d dollars. What is $t - d$?

(A) 15 **(B)** 20 **(C)** 25 **(D)** 30 **(E)** 35

2017B

5. Camilla had twice as many blueberry jelly beans as cherry jelly beans. After eating 10 pieces of each kind, she now has three times as many blueberry jelly beans as cherry jelly beans. How many blueberry jelly beans did she originally have?

(A) 10 **(B)** 20 **(C)** 30 **(D)** 40 **(E)** 50