

Math Competition Questions 1

Math 180 Strategies of Problem Solving

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August 25, 2021

Question 1

Question

Which of the following values is largest?

(a) $2 \times 0 + 1 + 7$

(b) $2 + 0 + 1 + 7$

(c) $2 \times 0 \times 1 \times 7$

(d) $2 + 0 \times 1 + 7$

(e) $2 + 0 + 1 \times 7$

Question 2

Question

What is the value of the expression $\sqrt{16\sqrt{8\sqrt{4}}}$?

- (a) 8
- (b) $4\sqrt{2}$
- (c) 4
- (d) 16
- (e) $8\sqrt{2}$

Question 3

Question

What is the value of the expression

$$\frac{1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 \cdot 6 \cdot 7 \cdot 8}{1 + 2 + 3 + 4 + 5 + 6 + 7 + 8}?$$

- (a) 1220
- (b) 2240
- (c) 1020
- (d) 1120
- (e) 3360

Question 4

Question

Let Z be a 6-digit positive integer, such as 247247, whose first three digits are the same as the last three digits taken in the same order. Which of the following numbers must also be a factor of Z ?

- (a) 111
- (b) 19
- (c) 101
- (d) 11
- (e) 1111

Question 5

Question

All of Marcy's marbles are blue, red, green, or yellow. One third of her marbles are blue, one fourth of them are red, and six of them are green. What is the smallest number of yellow marbles that Marcy could have?

- a 5
- b 3
- c 2
- d 1
- e 4

Question 6

Question

A square-shaped floor is covered with congruent square tiles. If the total number of tiles that lie on the two diagonals is 37, how many tiles cover the floor?

- a 361
- b 148
- c 1296
- d 324
- e 1369

Question 7

Question

Peter, Emma, and Kyler played chess with each other. Peter won 4 games and lost two games. Emma won 3 games and lost 3 games. If Kyler lost 3 games, how many games did he win?

- a 2
- b 3
- c 0
- d 4
- e 1

Question 8

Starting with some gold coins and some empty treasure chests, I tried to put 9 gold coins in each treasure chest, but that left 2 treasure chests empty. So instead I put 6 gold coins in each treasure chest, but then I had 3 gold coins left over. How many gold coins did I have?

Question

- a 81
- b 63
- c 45
- d 27
- e 9

Question 9

Question

For any positive integer M , the notation $M!$ denotes the product of the integers 1 through M . What is the largest integer n for which 5^n is a factor of the sum $98! + 99! + 100!$?

- a 23
- b 26
- c 25
- d 27
- e 24

Question 10

Question

Suppose a , b , and c are nonzero real numbers such that $a + b + c = 0$. What are the possible values for

$$\frac{a}{|a|} + \frac{b}{|b|} + \frac{c}{|c|} + \frac{abc}{|abc|}?$$

- a 2 and -2
- b 0, 1, and -1
- c 1 and -1
- d 0, 2, and -2
- e 0