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by parmenides51

- 1 In a right-angled triangle, the sum  $a + b$  of the sides enclosing the right angle equals 24 while the length of the altitude  $h_c$  on the hypotenuse  $c$  is 7. Determine the length of the hypotenuse.
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- 2 Within the real numbers, solve the equation

$$x^5 + \lfloor x \rfloor = 20$$

where  $\lfloor x \rfloor$  denotes the largest whole number less than or equal to  $x$ .

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- 3 Determine the integers  $n$  where

$$|2n^2 + 9n + 4|$$

is a prime number.

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- 4 Georg and his mother love pizza. They buy a pizza shaped as an equilateral triangle. Georg demands to be allowed to divide the pizza by a straight cut and then make the first choice. The mother accepts this reluctantly, but she wants to choose a point of the pizza through which the cut must pass. Determine the largest fraction of the pizza which the mother is certain to get by this procedure.
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- 5 For which natural numbers  $n \geq 2$  can the numbers from 1 to 16 be lined up in a square scheme so that the four row sums and the four column sums are all mutually different and divisible by  $n$ ?
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