

Qualifying Test for *Who Wants to Be a Mathematician*

<i>Student Name:</i>	<i>Grade:</i>
<i>High School:</i>	
<i>HS Address (incl. town/st./zip):</i>	
<i>Contact Person:</i>	<i>Contact Person Phone:</i>
<i>Contact Person Email Address:</i>	

Test-taker acknowledges that, if selected as a contestant for the AMS's WWtBaM contest, which selection belongs solely to the AMS, he/she will abide by the rules of the contest and that the decisions of the AMS as to prizes and eligibility thereto are solely at the discretion of the AMS.

The questions are on the back of this page. Don't start until instructed to do so. You don't have to show your work on this paper. Just write the final answer. No calculators. You have 15 minutes. Good luck!

Return completed test(s) to Mike Breen (email: paoffice@ams.org; fax: 401-331-3842; or mail: c/o American Mathematical Society; 201 Charles St.; Providence, RI 02904)

1. $(100 - 1)(100^2 + 100 + 1) =$ _____

2. What is the value of $\cos^2\left(\frac{\pi}{12}\right) - \sin^2\left(\frac{\pi}{12}\right) =$ _____
(no trig functions in your final answer)

3. What is the vertex of the parabola with equation $y^2 = 4x - 2$? _____

4. What is the height (length of any altitude) of an equilateral triangle with side length 2?

5. How many prime numbers are there between 100 and 110? _____

6. What is the probability of rolling a sum of 8 on two tosses of a fair six-sided die? _____

7. What is the measure, in degrees, of any interior angle in a regular nonagon (9 sides)? _____

8. After whom is the mathematical constant e named? (circle one)
- a. Leonhard Euler b. Eratosthenes c. Euclid d. Paul Erdős

9. Find all values of b so that all solutions to $2x^2 + bx + 2 = 0$ are real. _____
(including the case with only one solution)

10. -2 is one root of the polynomial $9x^3 + 18x^2 + x + 2$. What are the other two roots?

Thank you for participating.