

Skyview Invitational Games for Mathematical Achievement
Speed Math– 2006-2007 ROUND 2

Name _____ School _____
Division (circle one) Mu Alpha Theta

Score: _____
Verify: _____

Instructions: Write all answers in EXACT form in the box. Anything outside the answer box will be disregarded. Leave all answers in terms of π and reduced radicals. Express all fractions in improper form reduced to lowest terms. Make sure you write your answer in the correct box. You will have 15 minutes.

1. What is the area of a regular hexagon with sides of length 3?
2. $3^{3x} + 3^{2x+1} + 3^{x+1} + 1 = 1000$. What is x ?
3. What is the probability of choosing a non-king heart and a king when drawing two cards from a standard deck without replacement?
4. Which is the better deal, (A) a 16 oz Mathade for \$3.00, or (B) 22 oz Mathade for \$4.00?
5. If the vertices of a quadrilateral are (1,5), (8,5), (3, 6), (5,6), what is its area?
6. If $|5x - 3| < 5$ implies that $a < x < b$, what is $a \cdot b$?
7. $f(x) = \frac{3x - 8}{x - 3}$. What is $f(f(x)) = ?$
8. Find the sum of the infinite series $\left(\frac{1}{7} + \frac{2}{7^2}\right) + \left(\frac{2}{7^3} + \frac{4}{7^4}\right) + \left(\frac{4}{7^5} + \frac{8}{7^6}\right) + \left(\frac{8}{7^7} + \frac{16}{7^8}\right) + \dots$
9. For all real x , $f(x) + 2 \cdot f(2 - x) = x^2$, $f(3) = ?$
10. Simplify $\sqrt{180} - \sqrt{45} - \sqrt{20}$ to a number in the form $a\sqrt{b}$, where a, b are integers.
11. Given that the interior angle of a regular n -gon is 170° , what is n ?
12. The base 10 number 115 is what in base 6?
13. Charlie, Chuck, and Celine are siblings. Charlie is twice as old as Celine, and 5 years younger than Chuck. Five years ago, Chuck was three times as old as Celine. How old is Celine now?
14. $\lim_{x \rightarrow 6} \frac{x - 6}{\frac{1}{x} - \frac{1}{6}} = ?$
15. What is the 3rd hexagonal number?
16. If you receive 4% interest on a \$1000 deposit compounded yearly, how much is your money worth after 3 years (rounded to the nearest cent)?
17. What is the product of all possible values of x if $x^3 = \sqrt{2 + \sqrt{2 + \sqrt{2 + \dots}}}$
18. If $\sin(x) = \frac{3}{5}$, $\cos(x) = \frac{4}{5}$, what is $\sin(3x) = ?$
19. $\lim_{n \rightarrow \infty} \frac{8n^{10} + 4n^6 + 4}{2n^{10}} = ?$
20. $\int_0^\pi x \sin x \, dx$

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