

2022 Grissom Math Tournament

Algebra II : 3 – 4 – 5 Team Contest

Sample Round

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1. Evaluate: $2(16 - 9)^2 - 111/3$	2. How many multiples of 5 are there between 144 and 961?
3. Given a cube with edge = 11 inches, let A = the number of cubic inches in the volume of the cube and B = the number of square inches in the surface area of the same cube, what is the value of A – B?	4. Solve for x: $\frac{x+3}{4} - \frac{x+1}{5} = 2$
5. How many distinct arrangements are there of the letters in the word: ALGEBRA ?	

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Round 1

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Round 1

Round 1:

1. Write 4.363636.... as a rational number in simplest form.	2. What is the maximum value of the expression: $f(x) = 24x - 3x^2$?
3. What is the remainder when $(x^4 + x^2 - 6)$ is divided by $(x + 2)$?	4. Solve for x : $\begin{vmatrix} 1 & 2 & 3x \\ 0 & x & x \\ -1 & 5 & 3 \end{vmatrix} = -1$
5. Pooh and Piglet are paddling a canoe up and down the creek. They paddle at a constant rate. They paddle 24 kilometers round trip in the same 6 hours it takes Eeyore to float 9 kilometers downstream with the constant current. How fast would Pooh and Piglet paddle in still water?	

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Round 2

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Round 2

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1. Evaluate: $(\log_{10}(5 \log_{10} 100))^2$	2. Use determinants to find the area of triangle TAN if $T(1, -7)$, $A(2, 5)$, and $N(-2, 2)$.
3. If the graphs of $2y + x + 3 = 0$ and $3y + ax + 2022 = 0$ are to meet at right angles, what is the value of a ?	4. Solve for x : $\left(x - \frac{3}{4}\right)\left(x - \frac{3}{4}\right) + \left(x - \frac{3}{4}\right)\left(x - \frac{1}{2}\right) = 0$
5. A tank may be filled by pipe 1 or pipe 2. Pipe 1 by itself can fill the tank in 10 hours. Pipes 1 and 2 together can fill the tank in 6 hours. The drain can empty the tank in 5 hours. The tank is empty and the drain is closed. Pipes 1 and 2 are turned on. 5 hours later, the drain is opened and pipe 1 is shut off. How many hours after the drain is opened will the tank be empty?	

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Round 3

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1. For what value of a is the arithmetic mean of $7a$ and $3a - 4$ equal to a ?	2. Solve for x : $x^3 - 19x - 30 = 0$
3. What are the coordinates of the center of the circle with equation: $x^2 + y^2 - 4x + 2y - 4 = 0$	4. Right triangle ZAP has a right angle at A. If $AZ = x - 2$, $AP = x + 5$, and $ZP = 2x - 3$, what is the area of the triangle?
5. Write in $a + bi$ form: $\left(\frac{7-3i}{\frac{2-5i}{i} + 1}\right)^{-1}$.	

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Round 4

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Round 4

Round 4

1. Solve for x : $10^{2\log 3} = e^{\ln(8x+5)}$.	2. Write in simplified radical form: $\sqrt{\sqrt{\sqrt{a^{12}}}} \cdot \sqrt[3]{\sqrt[3]{a^{12}}}$
3. What is the coefficient of a^4b^2 in the expansion of: $(a + b)^6$?	4. Write y in terms of x if : $x = 3 + 2^p$ and $y = 3 + 2^{-p}$
5. A certain arithmetic series starts with 2, and the sum of the first 7 terms of the series is 21. If the sum of the first 22 terms is 121, then what is the sum of the first 100 terms?	

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