

Question #1 Algebra II
January 2001 Regional

For this problem $i = \sqrt{-1}$.

A = the simplified form of $\frac{5+4i}{2-2i}$

B = the simplified form of $i^{405} \cdot i^{390} \cdot i^{47} \cdot i^{803}$

Find $A + B$ in simplified $a + bi$ form.

Question #2 Algebra II
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Give the equation of the line, in $ax + by = c$ form, which passes through the center of the circle $x^2 + y^2 - 14x + 10y + 73 = 0$ and is perpendicular to $x + 2y = 5$.

Question #3 Algebra II
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A = the value of $\frac{f(1) - f(0)}{f(2)}$ when $f(x) = \frac{3x^2 - 2x + 1}{2x - 3}$

B = the value of n for $\log_3 3^{2n-3} + \log_3 \frac{1}{27} = \log_5 625$

Find the value of $\sqrt[3]{\frac{A}{B}}$.

Question #4 Algebra II
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Find a so that $y + 2$ shall be a factor of $3y^3 + 2(a - 3)y^2 + (a + 5)y + 2a$.

Question #5 Algebra II
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A = the negative root for $r^2 = 4r + 1$

B = the sum of the two roots of $\left| \frac{2x-3}{4} \right| = 5$

Find the exact value of AB.

Question #6 Algebra II
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A = $16^{\frac{3}{4}}$

B = the constant of $f^{-1}(x)$ when $f(x) = \frac{x+3}{5}$

C = the remainder when $x^3 + 8x^2 + 5x + 6$ is divided by $x + 7$

Find $\frac{C}{A} + B$.

Question #7 Algebra II
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A = the slope of the line perpendicular to $5x + 4y = 4$

B = the number of integral solutions of $s^2 < 2s + 3$

C = the solution of $\sqrt{x} = 2x - 1$

Find $A(B + C)$.

Question #8 Algebra II
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Solve for k : $\frac{1 - k^{-2}}{1 + k^{-1}} = \frac{2}{7}$

Question #9 Algebra II
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Jack and Jill solved $x^2 + px + q = 0$, but Jack was careless and used the wrong values for p . He got -2 and 39 as the values of x . Jill used the wrong value of q and got solutions of -4 and 11 . What are the actual roots?

Question #10 Algebra II
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Find the value of $x + y + z$ when

$$27^{(y-1)} = 9^{2y}$$

$$16^{\frac{x}{2}} = 8^{x-1}$$

$$\left(\frac{1}{2}\right)^{-\frac{1}{z}} = 4^{\frac{2}{3}}$$

Question #11 Algebra II
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A = the distance from P to $(-1,1)$ where point P lies on the line $y = \frac{2}{3}x + 1$ and has x -coordinate 6

B = the value of c when the lines $\frac{2}{3}x - \frac{2}{5}y = 6$ and $\frac{1}{2}x + cy = 9$ are perpendicular

Find $\frac{A^2}{B}$

Question #12 Algebra II
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A = the positive value of x for $(x^{-1+\sqrt{2}})(x^{-1-\sqrt{2}}) = 9$

B = the value of x for $\frac{2x}{3} + 3 = \frac{x}{3}$

C = the value of $\frac{x}{y}$ if $3x - 2y = 0$

Find $A + B + C$.

Question #13 Algebra II
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If $f(x) = 3x$ and $g(x) = \left(\frac{2x}{1-x}\right)$, find $g(f(x))$.

Question #14 Algebra II
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Solve for x : $\log_b x = 2 - a + \log_b \left(\frac{a^2 b^a}{b^2}\right)$

Question #15 Algebra II
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Find the solution set for $\frac{2}{x-3} > \frac{1}{x-1}$. Give answer in interval notation.