

QUESTION 1 Algebra 1 Regional March 2006

If $x \oplus y = xy$ and $x \otimes y = x - y$ then find $[3 \oplus (12 \otimes 8)] \otimes [(2 \oplus 3) \otimes 5]$

QUESTION 2 Algebra 1 Regional March 2006

The product of 2 consecutive odd positive integers added to their sum is 287. What are the 2 integers?

QUESTION 3 Algebra 1 Regional March 2006

Solve for all real values of x :

$$x\sqrt{x^3} = \frac{x^x}{x}$$

QUESTION 4 Algebra 1 Regional March 2006

Evaluate $(1,000,000,000,001)^2 - (999,999,999,999)^2$

QUESTION 5 Algebra 1 Regional March 2006

Simplify :

$$\frac{2^{3x+4} - 2^{3x+3}}{2^{3x}}$$

QUESTION 6 Algebra 1 Regional March 2006

Simplify Round to the nearest ten thousandth:

$$5 + \frac{1}{5 + \frac{1}{5 + \frac{1}{5 + \frac{1}{5 + \dots}}}}$$

QUESTION 7 Algebra 1 Regional March 2006

The denominator of a fraction exceeds the numerator by 8. If 2 is subtracted from the numerator, and the denominator is unchanged, the resulting fraction has a value of $\frac{7}{9}$. Find the original fraction.

QUESTION 8 Algebra 1 Regional March 2006

Given that $f(x)=x^2$ and $g(x)=x-1$ find $f\left(g\left(f\left(g\left(\frac{1}{2}\right)\right)\right)\right)$

QUESTION 9 Algebra 1 Regional March 2006

A jogger left home and jogged 5 miles east and 12 miles south. The jogger rested and calculated his distance from home "as the crow flies". What was this distance?

QUESTION 10 Algebra 1 Regional March 2006

Find the sum of the slopes of the lines determined by each of the following:

A) $(4, -2), (-7, 9)$

B) $4x - 3y = 9$

C) $\frac{x}{4} + \frac{y}{8} = 5$

D) $3y = x + 1$

QUESTION 11 Algebra 1 Regional March 2006

How many successive 10% discounts will be necessary to lower the price of an item to below 50% of the original price?

QUESTION 12 Algebra 1 Regional March 2006

A boy at a bus stop learned that the bus would leave in 38 minutes. The boy ran at an average speed of 12 mph and reached home at the same time as the bus. If the bus traveled at an average speed of 50 mph, how far was the bus stop from the boy's home?

QUESTION 13 Algebra 1 Regional March 2006

If y varies inversely as the square of x and y is 8 when $x = \frac{1}{2}$, find $|x|$ if $y = \frac{1}{8}$

QUESTION 14 Algebra 1 Regional March 2006

Factor completely :

$$2ax^2 + 2bx^2 + 2a^2x + 3abx + b^2x + a^2b + ab^2$$

QUESTION 15 Algebra 1 Regional March

The coordinates of the points A, B, C, and D are:
A(4, -6) B(0, -3) C(-2, -5) D(0, 4)

x = The slope of line AD

y = The slope of line AB

z = The slope of line BC

v = The slope of line CD

Find $8(x+y-z+v)$