

FAMAT Algebra 2 January Regional Team Test

1.

$A =$  the positive root of  $15x^2 = 7x + 4$

$B =$  the sum of the two roots of  $\left| \frac{2x-7}{4} \right| = 3$

Find the exact value of  $10A - B$

2.

Find  $\frac{ab}{c}$  if:  $4 = \begin{bmatrix} a & -2 \\ 5 & 2 \end{bmatrix} \quad \frac{4}{b+2} - \frac{7}{b+3} = 0 \quad c^4 = (-2)^{-12}$

3.

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

$A =$  the simplified form of  $\frac{3+2i}{4-i}$

$B =$  the simplified form of  $i^{24} \cdot i^{48} \cdot i^{73} \cdot i^{1009}$

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

4.

Given  $f(x) = 3x + 9 \quad g(x) = x^2 + 4x - 5 \quad h(x) = \frac{x-3}{x+5}$

$A = f^{-1}(g(1))$

$B = h(f^{-1}(6))$

Find  $A^B$

5.

$A = 27^{\frac{2}{3}}$

$B =$  the slope of  $f^{-1}(x)$  where  $f(x) = \frac{7+x}{5}$

$C =$  the remainder when  $2x^3 - 4x^2 - 7x - 6$  is divided by  $x - 4$

Find  $\frac{B}{A} - C$

6.

Find  $a$  so that  $x - 4$  shall be a factor of  $4x^3 + 2(a-5)x^2 + (a-4)x + 4a$

7.

Find the value of  $x + y + z$

$$9^{y-2} = \left(\frac{1}{3}\right)^{y+1}$$

$$32^{\frac{z}{10}} = 8$$

$$125^{\frac{1}{4}} = 25^{\frac{3}{x}}$$

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8.

$A$  = the value of  $\frac{f(0) + f(1)}{f(-1)}$  when  $f(x) = \frac{x^2 - 2x + 5}{2x - 1}$

$B$  = the value of  $n$  for  $\log_5 5^{3n-4} + \log_5 \frac{1}{25} = \log_3 27$

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

9.

Give the equation of the line, in  $Ax + By + C = 0$  form, which passes through the center of the circle  $x^2 - 8x + y^2 + 4y - 80 = 0$  and is parallel to  $4x - y = 24$ .

10.

$A$  = the radius of the circle  $x^2 + y^2 - 6x + 10y + 9 = 0$

$B$  = the number of integral solutions of  $x^2 < x + 12$

$C$  = the solution of  $3\sqrt{x} = x - 10$

Find  $(AB - C)^2$

11.

Find the product of  $A \cdot L \cdot G \cdot 2$  where  $\log_A 64 = 2$   $\log_2 L = -1$   $\log 1 = 3 \log_5 G$

12.

Find  $x + y$  if  $2^{3x-y} = 32$  and  $0.0625^{x-y} = 64$

13.

Solve for  $k$ .  $\frac{7}{3} = \frac{1 - k^{-2}}{1 + k^{-1}}$

14.

$A$  = the distance from  $P$  to  $(9, -1)$  where  $P$  lies on the line  $y = \frac{4}{3}x - 5$  and has a  $y$ -coordinate of 3.

$B$  = the value of  $k$  when the lines  $\frac{2}{3}x - \frac{2}{5}y = 8$  and  $\frac{1}{4}x + ky = 9$  are perpendicular to each other.

Find  $\frac{A}{B}$

15.

Sarah can clean the house in 2 hours while Eddie can clean it in 3 hours. Let  $A$  = the number of hours it will take them to clean the house if they work together.

A ball is dropped from 30 feet. It rebounds after the first bounce to  $\frac{5}{6}$  of its original height (30 feet) and on the second bounce to  $\frac{5}{6}$  of the previous bounce and so on.

Let  $B$  = the bounce in which the ball is first below 7 feet.

Find  $5A + B$