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# FAMAT MARCH REGIONAL *Plant '99* ALGEBRA I TEAM QUESTIONS

1) Find the answers to parts A) and B). Then write the larger of the two answers correctly rounded to 3 decimal places.

A) Calculate :  $950 \cdot (1.02)^3$

B) A bracelet can be sold for \$20. The cost, in dollars, of producing  $x$  bracelets is  $C(x) = 8x + 24$ . Find the profit when selling 86 bracelets.

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2) The base of a triangle and the side of a rectangle are "attached" to each other. The altitude of the triangle is 50 centimeters and the adjacent side of the rectangle is 100 centimeters long. Together, the area of both figures is 5250 square centimeters. Find the length of the base of the triangle. (Or the length of the first side of the rectangle. They are the same.)

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3) Nick decides to buy two different kinds of candy at the store. In one bag, Nick puts two handfuls of toffees and in another bag Nick puts three handfuls of licorice. The toffee costs \$3.50 per pound and the licorice costs \$1.75 per pound. At the register, the total cost for the candy is \$3.85 for 1.7 pounds. How many pounds of each kind of candy did Nick purchase?

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4) Given  $f(x) = 7 + \sqrt{x}$  and  $g(x) = (2x - 1)^2$

A =  $g(f(4))$

B =  $f(g(9))$

C = one value of  $x$  when  $f(g(x)) = 10$

D = the other of  $x$  value when  $f(g(x)) = 10$

Find  $\frac{AB}{CD}$

5) Ross breaks open his piggy bank and discovers 202 coins worth \$32.80. He has 8 more than twice as many dimes as nickels and 53 less than twice as many quarters as dimes. How many quarters does Ross have?

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6) If  $x^2 + y^2 = 100$  and  $x = 6$ , find the sum of the values for  $(x + y)^2$ .

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7) The line L has equation  $4x + 3y = 9$ . Find the equation of the line perpendicular to L which passes through the point of intersection of L and the y-axis. Give your answer in the form  $ax + by = c$ ; a, b, c are integers.

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8) A = the y-intercept of  $4x - 5y = -25$

B = the slope of  $4x - 5y = -25$

C = the slope of any line parallel to  $4x - 5y = -25$

D = the slope of any line perpendicular to  $4x - 5y = -25$

Find  $AB - CD$

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9) Becky, a world famous speedboat racer, is racing on the Wakulla River. The course requires Becky to drive 1000 meters down the river and then return upstream to the starting point. The current in the river is known to be 2 meters per second. Becky's boat took 5 minutes for the round trip. How fast was Becky's boat traveling through the water (accurate to 2 decimal places)?

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10) The function f is defined by  $f(x) = x^2 + 2$ . Solve the equation  $f(3 + x) = f(3x)$ .

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11) Paul Poor and Richie Rich each had some money to place into savings accounts. Paul put his \$1320 into the Farmers and Merchants Bank while Richie put his \$42,500 into the Hollywood National Bank. Neither boy made any withdrawals nor deposits for three years. At that point they both withdrew all of their money to pay for college. Paul withdrew \$1585.32 while Richie withdrew \$50,787.50. Who did better? Which boy had the best simple interest rate and what was that rate? Record both answers on your answer sheet.

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12) Find x.  $2^x \cdot 4^x \cdot \left(\frac{1}{8}\right)^x = 32^{x-1}$

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13) Mr. Freed's Algebra I class had the following grades on a quiz. (Note : The maximum grade was a 7.)

GRADE	1	2	3	4	5	6	7
FREQUENCY	0	3	5	9	7	4	3

Find the mean, median, mode, and range for this set of data. Round any answers to the nearest tenth if necessary. Add up your four answers and write the sum on your answer sheet.

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14) Ima Robber robs (what else!) the Fifth National Bank in Tallahassee. She drives in her get-a-away car 50 miles to the McDonalds in Perry at an average rate of  $66\frac{2}{3}$  miles per

hour. Ten minutes later, Willie Ketchup, a cop given a tip, sets out in his car from the same bank to the same McDonalds in Perry at an average rate of 80 miles per hour. When Ima gets to the McDonalds, she starts to count her money at a rate of \$10 per second. How much money had Ima counted when Willie caught up and apprehended her?

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15) Find the ordered triple solution.

$$5x - 5y + 2z = 13$$

$$2x - 4y + 3z = 8$$

$$3x + 2y - 4z = 2$$