MATH 100   ANSWERS TO OLD TEST I

21 SEPTEMBER 2017

Instructions: Choose any 15 of the following 18 problems. You may answer more than 15 to earn extra credit! *For each problem, be certain to show your work! You may use your calculator, but you still must show your reasoning! Be sure to place a box around your answer.*

1. Compute the value of

$$a^{1789} + (3b + 99a + 2017)^0 + (a + 2b)^2 - (b - 2a)^{99} \text{ when b = 2 and a = 1.}$$

   Simplify your answer fully.

   Answer: **27**

2. Compute the value of $7(2 + x - x^2)^3$ when x = -3. *Simplify* your answer fully.

   Answer: **-7000**

3. An eagle is 4 times as old as a falcon. Three years ago, the eagle was 7 times as old as the falcon. Find the present age of each bird now. (Guessing will result in little or no credit.)

Answer: the **current age of the falcon is 6 years and the current age of the eagle is 24 years.**

4. The time required to go by train between AlphaVille and BetaVille is three hours less than the time required to go by Greyhound bus. The average rate of the bus is 25 miles an hour less than the average rate of the train. Assume that the two cities are 300 miles apart. If *r* denotes the rate of the train, write an equation that can be used to solve for *r*. *(Do not solve.)*

Answer: **300/(r + 25) = 3 + 300/r**

5. If *p* snow plows clear *9* streets in *36* days, *how many days* does it take for one snow plow to clear one street? Explain your reasoning.

Answer: *One snow plow can clear one street in 4p days.*

6. If pumpkins sell at 5 for $18 dollars and Halloween candy sells at 17 bags for $11, *how much will it cost* to buy *x* pumpkins and *y* bags of candy?

Answer: The *total cost is*   **18x/5 + 10y/11 dollars**

7. Subtract $x^4 - 8x^3 + 2x^2 - 3x + 1$ from $x^4 + 11x^3 - x^2 + 4x - 4$ and simplify your result.

   Answer: $\mathbf{19x^3 - 3x^2 + 7x - 5}$

8.   Albertine purchases a used car from the AtYourOwnRisk Enterprise for $4,800.00. The car's price had been reduced by 35 %. What was the *original price* of the car?   (Disregard tax.) Give your answer to the nearest penny.

Answer: $ 7384.62

9. The perimeter of a triangular garden is 82 feet. Find the length of each of the three sides if one side is 7 feet greater than twice the length of the smallest side, and the third side is 3 feet less than three times the length of the smallest side.

Answer:

The lengths of the three sides are: 13 feet, 30 feet, and 33 feet.

10. Currently 12,345 wombats live in Alphaville. Suppose that the population of Alphaville *increases* by 175 wombats each year.   Currently 20,000 wombats live in Betaville. Suppose that the population of Betaville *diminishes* by 80 wombats each year.   In *how many years* from now will Alphaville and Betaville have the same wombat population? Round your answer to the nearest year.

Answer: 30 years.

11.   Walking at a constant rate, Odette can walk 13 miles in 3 hours. Albertine can walk twice as fast as Odette. How long does it take for Albertine to walk *z* miles?   *Show your work!*

Answer: 3z /26 hours.

12.   The length of a room exceeds its breadth by 8 feet; if the length had been increased by 2 feet, and the breadth had been increased by 2 feet, the area would have been increased by 60 square feet: find the original dimensions of the room. Write an equation in one variable that can be used to solve this problem. Do not solve.

Answer: Let W = original length of the room (in feet).

(W +2)(W + 10) = W(w + 8) + 60.

13. Find two numbers which differ by 4, and such that one-half of the greater exceeds one-sixth of the lesser by 8. Solve explicitly for the two numbers.

Answer: The two numbers are 18 and 22.

14.   Compute the value of $7(1 + x^2)^3$ when x = -3. *Simplify* your answer fully.

Answer: 7000

15.   Solve for x: $x(x - 2) - x(2x + 1) = 5 - x^2 + 3(x - 4)$

   Answer: x = 7/ 6

16. Simplify fully the expression:
$$-2\{-[-(x-y)\,]\} + \{-2[-(x-y)]\}$$

Answer: **0**

17. Solve $7x - 5[x - \{7 - 6(x - 3)\}] = 3x + 1$

Answer: $x =$ **4**

18. The sum of four *consecutive odd* integers is 8072. Find the *smallest* number.

Answer: The smallest of the four integers is **2015**.