Math 100 Practice final



**PART I** *(5 pts each)*

(Answer any 23 of the following 25 problems. You may answer more to earn extra credit!) *Show your work!*

1. Simplify: 

Express your answer as a single fraction.

1. ***x*** pizzas are to be distributed evenly among ***y*** customers. If ***z*** of the original pizzas are stolen before the customers arrive, how many pizzas will each customer be given?
2. Factor fully: x6 + 4x5 + x4 + 4x3
3. If apples are priced at 8 for $5 and oranges are priced at 5 for $8, how much would it cost to purchase 10 apples and 12 oranges?
4. Express in algebraic symbols the excess of the sum of *a* and *b* over *c* diminished by *d*.
5. Subtract w – 10x – 14y + 15z from w + 3x – 4y – z and simplify the result.
6. Expand and simplify (a + b)(c + d) – (a – b)(c – d)
7. The current population of the United States is estimated to be 316,570,000 and that of Iceland 323,810. Using scientific notation, compute the ratio of the population of the U.S. to that of Iceland.
8. Simplify –{– [– (a – (b – c + 1))]}
9. What is the current age of Albertine who *y* years ago was *m* times as old as her child then aged *x* years?
10. Factor 6x2 + 11x – 10
11. Solve the inequality: |x – 2017| > 0
12. Swann is shopping for a new hedge trimmer. He finds that the sale price of a hedge trimmer that was reduced by 38% is $147.89. Find the original price of the hedge trimmer.
13. One number exceeds another by 9, and their sum is 71; find them.
14. Solve the inequality |x – 5| ≤ 13. Express your answer in interval form.
15. Solve the inequality 13 + x ≤ 5(1 – x)
16. Let f(x) = 2x2 + x + 1. Find f(x + 1) and simplify.
17. In 2016, the population of rabbits in Betaville was 11,089 and growing by 71 rabbits each year. Find a formula, *P*, for the town’s rabbit population, in terms of *t*, the number of years since 2016.
18. Multiply  and simplify your answer.
19. Write the equation in *slope-intercept* form 2(1 – 3(1 – x – y)) = x + y
20. Find the *domain* of the function
21. (a) Find the LCM of 15, 90, and 99.

(b) Find the LCM of x(x – 3), x3(x – 4)(x – 5), and x2(x – 4)2(x + 13).

(c) Find the GCD of 15, 90, and 99.

(d) Find the GCD of x(x – 3), x3(x – 4)(x – 5), and x2(x – 4)2(x + 13).

1. Simplify  and express with *positive* exponents.
2. Multiply and express in scientific notation:

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1. Factor (2 + x – y)2 – (1 + x – 2y)2
2. Simplify + (-2017)0  – (-1)5555
3. Simplify and express with positive exponents.

**pART II** *(12 pts each)*

(Answer any 12 of the following 15 problems. You may answer more to earn extra credit!) *Show your work!*

1. The sum of the digits of a two-digit number is 12. The original number exceeds the number with its *digits interchanged* by 18. Find the original number.
2. Walter White has two acid solutions, one 20% acid and the other 75% acid. Find, to the nearest integer, the number of cubic centimeters of each solution he must use in order to produce 200 cubic centimeters of a solution that is 60% acid.
3. Solve using *Gaussian elimination:*

5(x + 2y) – (3x + 11y) = 14

 7x – 9y – 3(x – 4y) = 38

1. Swann is four times as old as Gilberte.  Twelve years from now, Swann's age will be 2 years more than twice that of Gilberte.  How old is Gilberte now?
2. Simplify fully:



1. Alphaville and Betaville are 355 miles apart.  At 1 pm, a train leaves from Alphaville traveling toward Betaville at the rate 40 mph.  At 2 pm, a train leaves from Betaville traveling toward Alphaville at the rate of 50 mph.  At what time will the two trains meet?

7.   All merchandise at the Gammaville Rock Shop is reduced by 18% today.  Sales tax is 7 % of the selling price.  If Sabine pays $78.90 (including tax) for a fossil at the Rock Shop today, what was the original selling price of the fossil (before the 18% discount)?

8.   Lucky has 72 coins of which some are dimes and the rest quarters.  If the total value of the coins is $10.95, how many coins of each type are there?

9.   Find the equation of a line that is *perpendicular* to 2x – 4y = 7 and passes through the point P = (1, 1)

10.   The sum of a number and its square is 102 more than 30 times the next higher number.  Find the number.

11. Multiply 6x3 – 46 x2 +39x – 9 by 8x – 3.

12. Solve for x: 

13. Simplify fully: 

1. Simplify fully the complex fraction: 
2. Albertine decides to spend a few hours on her boat. In still water, her boat can travel at 30 mph. How far downstream can Albertine go if the current is 8 mph and she wishes to return to the dock within 5 hours?

*Nothing was ever achieved without enthusiasm.*

- [Ralph Waldo Emerson](http://plato.stanford.edu/entries/emerson/)