Math 109 - Test 1A

February 13, 2020

Name _____

Score _____

Show all work to receive full credit. Supply explanations where necessary.

1. (4 points [3]) Which of these equations ARE linear equations? Circle all that apply.

$$\frac{6}{x+5} + 3 = \frac{1}{x}, \qquad 5(2-x) = x, \qquad x(x-6) = 0, \qquad \frac{2x}{3} + \frac{1}{6} = x$$

2. (3 points [3]) Solve for x: $3x - 9 = 8$

3. (4 points [3]) Solve for w: $\dfrac{12 - 6w}{5} = 6$

4. (4 points [3]) Yesterday, David rode his bike at the speed of 10 miles per hour. Today, he rode at 14 miles per hour. In the two days, he biked for a combined total time of 9 hours. Let x be the number of hours he biked yesterday. Write an algebraic expression in terms of the single variable x that gives the total number of miles he biked in the two days. (Remember that *distance equals rate times time*.)

5. (4 points [3]) Solve for r: $3r - (5 - 2r) = 3(r - 2) + 2r + 2$

6. (3 points [3]) Solve for x: $4 - 7x \le 32$

7. (3 points [3]) On an interstate expressway, you cannot drive slower than 45 mph and you cannot drive faster than 70 mph. Use x to represent speed (in mph), and write an inequality that describes the speeds you can drive.

8. (5 points [3]) Solve for y. Write your solution set in interval notation, and graph it on a number line.
$$8y + 14 < 2(3 + 2y) + 7y$$

9. (4 points [3]) Solve for x: $3x + 13 > \frac{3}{2}(4 + 2x)$

10. (6 points [3]) Solve for y. Write your solution set in interval notation, and graph it on a number line.

$$3(y - 4) + 2y > 3 \qquad \text{or} \qquad 7 - 2y \geq 13$$

11. (3 points [3]) Kate Jindo sells her famous, craft hot sauce for \$8 per bottle. Let b represent the number of bottles that Kate will sell at the farmer's market. Kate would like to make at least \$300. Write an inequality involving b that Kate could solve to determine the numbers of bottles she must sell.

12. (4 points [1,9]) Determine the values of x that are restricted from the following expression: $\dfrac{x-6}{x^2+2x-15}$

13. (4 points [1,3,9]) Solve for u: $\dfrac{5}{u} = \dfrac{8}{u-7}$

14. (4 points [1,3,9]) Solve for x: $5 - \dfrac{3}{x+3} = \dfrac{x}{x+3}$

15. (4 points [7]) Solve for x: $8(3x-7)(x-9) = 0$

16. (5 points [7]) Solve for t: $\quad t^2 + 4t + 3 = 15$

17. (5 points [9]) Solve for x. Round your final answer(s) to the nearest hundredth.

$$(2x + 5)^3 - 10 = 0$$

18. (6 points [7]) Solve for x. Write your final answer(s) in decimal form, rounded to the nearest hundredth.

$$2x^2 - 3x - 1 = 0$$

19. (4 points [9]) Solve for w: $\quad 8 + \sqrt{5w + 2} = 4$

20. (10 points [3,7,9])   Solve for x: $$\frac{6}{(x-1)(x-3)} = 1 + \frac{3}{x-3}$$

21. (4 points [9])   Solve for x. Round your answer(s) to the nearest hundredth.

$$(x-4)^3 + 17 = 3$$

22. (4 points [9])   Solve for x: $(3x-7)^{1/5} - 2 = 0$

23. (3 points [9])   The following equation is "quadratic in form." In order to solve it, what substitution would be most helpful? (Do not solve the equation.)

$$(\sqrt{x}-4)^2 + 3(\sqrt{x}-4) + 2 = 0$$