MATH 082, Fall 2022
Test 3 Review
(Chapters 7 - 10)
Show all of your work to receive full credit.

Name: _____

Simplify the following exponents using properties of exponents. Make sure that your final answer contains positive exponents only.

1. $(x^2y^{-1})^{-4}$

2. $\dfrac{(x^2y^2)^3 \cdot (x^3y)^2}{x^{-2}y^{-1}}$

3. $\left(100y^{\frac{2}{5}}\right)^{\frac{3}{2}}$

4. Perform the indicated operations while leaving your answer in scientific notation.
   $(2.1 \times 10^5) \cdot (1.25 \times 10^3)$

5. Simplify the following square root $\sqrt{196}$.

Perform the indicated operations with the following polynomials.

6. $(5x^2 - 12x + 1) - (2x^2 + 3x - 7)$

7. $(3x - 7)(9x^2 + 21x + 49)$

Factor the following polynomials completely. If it can not be factored further, state so.

8. $8x^3 + 16x^2y$

9. $x^2 + 5x - 36$

10. $n^2 + 16$

11. $7a^2 + 48a + 36$

12. $2x^3 - 10x^2 + 4x - 20$

Perform the indicated operations with rational expressions. Make sure to fully reduce your final answer.

13. $\dfrac{5x - 15}{4x^2} \cdot \dfrac{x^3}{6x - 18}$

14. $\dfrac{x^2-5x+4}{x^2} \div \dfrac{x-1}{x}$

15. $\dfrac{y}{y^2-9} + \dfrac{3}{y^2-9}$

16. $\dfrac{x+2}{x-5} - \dfrac{x}{x+1}$

Solve the following equations.

17. $x^2+17x+49 = 3x$

18. $\dfrac{10}{x^2+x-6} = \dfrac{x}{x-2} + \dfrac{2}{x+3}$

19. The product of two consecutive positive integers is 210. Find the integers.

20. A boat that travels 25 mph in still water, travels 42 miles upstream and 27 miles back downstream in 3 hours. What is the speed of the current?