Test 2 Review

Math 103

October 2024

1. Simplify each rational expression using only positive exponents.

   a) $(a^{-4}b^2c)^{-3}(a^{-2}b^5c^3)$

   b) $\left(\dfrac{4x^5y}{2x^4}\right)^3\left(\dfrac{3x^2}{y^4}\right)$

   c) $\dfrac{4a^8b^3}{20a^2b^{-5}}$

2. Preform the indicated operation, and simplify:

   (a) $20n - 3(6n - n^2) + 9(8n + 7)$

   (b) $(3y - 4)(y^2 + 5y - 2)$

   (c) $(2x - 5y)^2$

3. Factor each expression completely:

a) $15x^2 - 8x - 16$

b) $8x^3 - y^3$

c) $x^3 + 3x^2 - 16x - 48$

4. Find all solutions to the following equations

a) $3x^2 - x = 14$

b) $x^3 - 17x^2 + 52x = 0$

c) $(y+7)(y-2) = 10$

5. Simplify as much as possible: $\dfrac{8x^2 - 28x}{35 - 10x}$

6. Perform the indicated operation(s) and simplify as much as possible:

a) $\dfrac{x+8}{x^2 + 6x + 8} + \dfrac{2}{x+2}$

b) $\dfrac{5}{x^2 + 11x + 24} - \dfrac{1}{x+3}$

c) $\dfrac{7x^2 - 17x - 12}{x^2 - 9} \div \dfrac{5x^2 + 15x}{x^2 + 6x + 9}$

d) $\dfrac{\dfrac{1}{x+4} + 5}{\dfrac{1}{x} - 1}$

7. Working together, Taro and Mischa can mow a large lawn in 75 minutes. Working alone, Mischa can mow the lawn 30 minutes faster than Taro can. How long would it take each of them working alone to mow the lawn? Round your answer to the nearest minute. **For full credit, set up and solve an equation or system of equations.**

   Extra Credit

8. Factor the expression completely: $9x^2 + 6xy + y^2 - y^6$

9. Find values of A and B so that the equation:
$$\frac{3x + 4}{x^2 + 3x - 10} = \frac{A}{x + 5} + \frac{B}{x - 2}$$