

Please show all your work to ensure full credit.

1. Perform the following operations and simplify. The rational expression in your final answer should be in lowest terms.

a) $\frac{3x-1}{x^2-4} - \frac{(x+2)}{3x^2-5x-2}$

b) $\frac{x^2-9}{x^2+2x-3} \div \frac{2x^2-7x+3}{4x^2-1}$

2. Simplify and write your answer without any negative exponents. Your final answer should be in lowest terms.

$$\left(\frac{x^3y^{-2}}{2x^5y^{-3}}\right)^{-2}$$

3. Assume all variables are positive real numbers. Simplify and write your final answer as one radical term. Do not leave any radical terms in the denominator (that means rationalize the denominator if necessary).

a) $\sqrt{5a^3b^5}\sqrt{10a^4b^3}$

b) $\sqrt{\frac{2a^8b^7}{50a^4b^3}}$

c) $(3 - 5\sqrt{3})(3 + 5\sqrt{3})$

d) $\frac{4-7\sqrt{2}}{3+5\sqrt{3}}$

e) $\frac{3+2i}{2-3i}$

4. Perform the long division below and find the remainder and quotient.

a) $(5x^2 - 3x + 1) \div (x - 2)$

b) $(5x^2 + 10x^3 + 2x - 10) \div (2x^2 + 3x - 5)$