

[polynomials + rational expressions]

1. Expand and simplify

a. $7a^2 - 2(3a - 4) + 3a(5 - 2a)$

b. $3(4a - 1)^2 - (2a + 1)(4a - 3)$

c. $(a - 2)(2a + 3b - 5)$

2. Simplify and state the restrictions:

a. $\frac{-54a^3b^2c^5}{27ab^4c^3}$

b. $\frac{a^2 - a - 12}{a^2 - 4a}$

3. Factor fully:

a. $5a^2b^3 - 20a^3b^4$

b. $a^2 - 7a + 12$

c. $9a^2 - 25b^2$

d. $(a + 2)^2 - 49b^2$

e. $8a^2 - 10a - 7$

f. $4a^2 - 4a + 1 - 9b^2$

g. $7a^2 - 28a - 35$

h. $ax - ay - bx + by$

i. $4a^3 - 8a^2 - 25a + 50$

j. $a^2 + 2a + 1 - x^2 - 2xy - y^2$

4. Simplify (restrictions not required):

a. $\frac{4a^2 - 8a}{a^2 - 5a + 6} \times \frac{a - 3}{a^2 - 9}$

b. $\frac{8xy}{x^2 - 4} \div \frac{16x^2}{3x - 6}$

c. $\frac{6a^2 + 13a - 5}{2a^2 + 3a - 5} \times \frac{4a^2 - 4}{9a^2 - 1}$

d. $\frac{5x}{4} + \frac{3}{5x} - 1$

e. $\frac{\frac{3}{x-4}}{\frac{7}{x+3}}$

f. $\frac{5a+1}{a^2-4} + \frac{4a}{a^2+5a+6}$