

Answer on Question #44414 – Math - Algebra

Problem

Factor each expression

1.) $24g^2 - 39gh + 51h^2$.

2.) $8ac - 2ad + 4bc - bd$

3.) $2ax - 4bx + 2ay - 4by$

4.) $u^3 + 2u^2 + u + 2$

5.) $8v^3 + 2v^2 + 12v + 3$

Solution

1) $24g^2 - 39gh + 51h^2 = 3(8g^2 - 13gh + 17h^2)$.

$D = 169h^2 - 4 \cdot 8 \cdot 17h^2 = -375h^2 < 0$.

Therefore expression $8g^2 - 13gh + 17h^2$ doesn't have divisors of smaller degree in $\mathbb{R}[g, h]$ (it couldn't be factorize).

2) $8ac - 2ad + 4bc - bd = 2a(4c - d) + b(4c - d) = (2a + b)(4c - d)$.

3) $2ax - 4bx + 2ay - 4by = 2x(a - 2b) + 2y(a - 2b) = (2x + 2y)(a - 2b) = 2(x + y)(a - 2b)$.

4) $u^3 + 2u^2 + u + 2 = u^2(u + 2) + (u + 2) = (u^2 + 1)(u + 2)$.

5) $8v^3 + 2v^2 + 12v + 3 = 2v^2(4v + 1) + 3(4v + 1) = (2v^2 + 3)(4v + 1)$.