

Answer on Question #43652 – Math – Algebra

Factor the following:

$$9x^2 - y^2 - 4z^2 + 4yz$$

Factor $-y^2 + 4yz + (9x^2 - 4z^2)$

by splitting the product $4z^2 - 9x^2$
into two parts whose sum is $4z$.

The factors of $4z^2 - 9x^2$ that sum to $4z$ are $y(2z - 3x)$ and $y(3x + 2z)$.

So, $-y^2 + 4yz + (9x^2 - 4z^2) = -y^2 + y(2z - 3x) + y(3x + 2z) + (3x - 2z)(3x + 2z)$:

$$-y^2 + y(2z - 3x) + y(3x + 2z) + (3x - 2z)(3x + 2z)$$

Factor pairs of terms in

$-y^2 + y(2z - 3x) + y(3x + 2z) + (3x - 2z)(3x + 2z)$
by grouping.

$-y^2 + y(2z - 3x) + y(3x + 2z) + (3x - 2z)(3x + 2z) = (3x + 2z)(y + (3x - 2z)) - y(y + (3x - 2z))$:

$$(3x + 2z)(y + 3x - 2z) - y(y + 3x - 2z)$$

Pull a common factor out of

$$(3x + 2z)(y + 3x - 2z) - y(y + 3x - 2z).$$

Factor $3x + y - 2z$ out of $(3x + 2z)(y + 3x - 2z) - y(y + 3x - 2z)$,
resulting in $(y + 3x - 2z)((3x + 2z) - y)$:

Answer:

$$(y + 3x - 2z)(-y + 3x + 2z)$$