Problem 1. What is your favorite color?

Lavender.

Problem 2. State what it means to factor a polynomial.

Factoring a polynomial means writing it as a product.

Problem 3. Factor the following polynomial: $(21 + 4y - y^2)(y^2 - 3y - 10)^2$

$$(21 + 4y - y^2)(y^2 - 3y - 10)^2 = -(y^2 - 4y - 21)(y^2 - 3y - 10)^2$$

$$= -(y - 7)(y + 3)(y - 5)(y + 2)^2$$

$$= -(y - 7)(y + 3)(y - 5)^2(y + 2)^2$$

Problem 4. Simplify the following expression: $(u^4v^2)^{1/3}(uv)^{-1/3}$. Be sure to restrict the domain of your simplified answer, if necessary.

$$\left(\frac{u^4v^2}{(uv)^{1/3}}\right) \cdot \left(\frac{1}{(uv)^{1/3}}\right) = u^{4/3} \cdot v^{2/3} \cdot u^{-1/3} \cdot v^{-1/3}$$

$$= u^{4/3 - 1/3} \cdot v^{2/3 - 1/3}$$

$$= u^{1/3} \cdot v^{1/3}$$

$$= u \cdot v^{1/3}$$

\(u \neq 0 \text{ and } v \neq 0\)