

1. Factor: $6y - 6x^2y^7$ (Hint: factor out the GCF first)

$$\begin{aligned}
 &= 6y(1 - x^2y^6) \\
 &= 6y(1^2 - (xy^3)^2) \\
 &= \boxed{6y(1 + xy^3)(1 - xy^3)}
 \end{aligned}$$

2. Factor completely: $81x^4 - 16$ (Note: you'll need to factor more than once, so keep going!)

$$\begin{aligned}
 &= (9x^2)^2 - (4)^2 \\
 &= (9x^2 + 4)(9x^2 - 4) \\
 &= (9x^2 + 4)((3x)^2 - (2)^2) \\
 &= \boxed{(9x^2 + 4)(3x + 2)(3x - 2)}
 \end{aligned}$$

3. Factor completely: $x^3 + 7x^2 - 4x - 28$

(Hint: first factor by grouping, then factor again via the $A^2 - B^2 = (A + B)(A - B)$ formula)

$$\begin{aligned}
 &= x^2(x + 7) - 4(x + 7) \\
 &= (x + 7)(x^2 - 4) \\
 &= \boxed{(x + 7)(x + 2)(x - 2)}
 \end{aligned}$$

4. Factor: $x^3 - 8$

$$\begin{aligned}
 &= x^3 - 2^3 \\
 &= \boxed{(x - 2)(x^2 + 2x + 4)}
 \end{aligned}$$

5. Factor: $1 + 27x^3y^3$

$$= 1^3 + (3xy)^3$$

$$= (1 + 3xy)(1 - 3xy + 9x^2y^2)$$

Q: What question can someone ask all day long, always get completely different answers, and yet all the answers could be correct?