ALGEBRA II
HOMEWORK #1-6
USING STRUCTURE TO FACTOR

1. Factor $(4x + 3)(2x - 1) - (x + 2)(2x - 1)$

GCF

$(2x-1)(4x+3-(x+2))$

$(2x-1)(4x+3-x-2)$

$(2x-1)(3x+1)$

2. Factor $(3x + 1)^2 - (x + 3)^2$

DOTS

let $A = 3x+1$

$B = x+3$

$A^2 - B^2$

$(A+B)(A-B)$

$(3x+1+x+3)(3x+1-(x+3))$

$(4x+4)(3x+1-x-3)$

$(4x+4)(2x-2)$

$4(x+1)\cdot 2(x-1)$

$\boxed{8(x+1)(x-1)}$

3. Factor $(x + 2)^2 + 8(x + 2) - 20$

3 terms → TRAM

let $y = x+2$

$y^2 + 8y - 20$ (A = 8, M = −20)

-2×10, $-2 + 10 = 8$

$(y-2)(y+10)$

$(x+2-2)(x+2+10)$

$\boxed{x(x+12)}$

4. Factor $x^4 + x^3 + 3x^3 + 3x^2 - 9x^2 - 9x - 27x - 27$

$x^3(x+1) + 3x^2(x+1) - 9x(x+1) - 27(x+1)$

$(x+1)(x^3+3x^2-9x-27)$ ← factor by grouping

$(x+1)(x^2(x+3)-9(x+3))$

$(x+1)(x+3)(x^2-9)$ ← DOTS

$(x+1)(x+3)(x+3)(x-3)$

5. Factor $2x^3 - 6x^2 + 5x - 15$

$2x^2(x-3) + 5(x-3)$

$(x-3)(2x^2+5)$

S O AP

6. Factor $27a^3 + 64b^6$ = $(3a + 4b^2)(9a^2 - 12ab^2 + 16b^4)$

$a = 3a \quad b = 4b^2$

$a^2 = (3a)^2 \quad b^2 = (4b^2)^2$

$= 9a^2 \quad = 16b^4$

$a \cdot b = 3a \cdot 4b^2$

$12ab^2$

7. If the difference $(2x^2 - x + 6) - (x^2 - 2x + 1)$ is multiplied by $\frac{1}{2}x^2$, what is the result, written in standard form?

$\frac{1}{2}x^2(2x^2 - x + 6 - x^2 + 2x - 1)$

$\frac{1}{2}x^2(x^2 + x + 5)$

$\boxed{\frac{1}{2}x^4 + \frac{1}{2}x^3 + \frac{5}{2}x^2}$