

**Instructions:** Complete the following problems. You may work alone or in a group. Do not just copy answers from a group member, but be sure that you understand the problem. Similar questions will appear on exams. You may be asked to explain or present the answers to the class. This assignment is due at the end of the class period.

Use the following formulas to factor the expressions below completely. Label A and B for each formula used.

- $(A^2 - B^2) = (A + B)(A - B)$
- $A^2 \pm 2AB + B^2 = (A \pm B)^2$
- $A^3 \pm B^3 = (A \pm B)(A^2 \mp AB + B^2)$

- $4p^2 + 4p + 1$   $(2p + 1)^2$
- $16x^2 - 24x + 9$   $(4x - 3)^2$
- $25k^2 - 70k + 49$   $(5k - 7)^2$
- $m^2 + 12m + 36$   $(m + 6)^2$
- $x^2 - 49$   $(x - 7)(x + 7)$
- $4a^2 - 25$   $(2a - 5)(2a + 5)$
- $k^8 - 256$   $(k^4 - 16)(k^4 + 16) = (k^2 + 4)(k^2 - 4)(k^4 + 16) = (k^2 + 4)(k^2 + 16)(k + 2)(k - 2)$
- $36b^4 - 121a^2$   $(6b^2 - 11a)(6b^2 + 11a)$
- $27 + x^3$   $(3 + x)(9 - 3x + x^2)$
- $8y^3 - z^3$   $(2y - z)(4y^2 + 2yz + z^2)$
- $x^6 - 8y^3$   $(x^2 - 2y)(x^4 - 2x^2y + 4y^2)$
- $16c^3 + 250d^3$   $2(8c^3 + 125d^3) = 2(2c + 5d)(4c^2 + 10cd + 25d^2)$
- $x^6 - 1$  (factor as a difference of cubes first)  $(x^2 - 1)(x^4 + x^2 + 1) = (x + 1)(x - 1)(x^4 + x^2 + 1)$
- $2x^5 - 162x$   $2x(x^4 - 81) = 2x(x^2 - 9)(x^2 + 9) = 2x(x + 3)(x - 3)(x^2 + 9)$
- $x^4y^3 + 216xy^3$   $xy^3(x^3 - 216) = xy^3(x - 6)(x^2 + 6x + 36)$
- $3s^7 + 24s$   $3s(s^6 + 8) = 3s(s^2 + 2)(s^4 - 2s + 4)$
- $9x^2 + y^2$  prime
- $3x^3 + 18x^2 + 27x$   $3x(x^2 + 6x + 9) = 3x(x + 3)^2$
- $(x + 1)^2 - 9$   $(x + 1 - 3)(x + 1 + 3) = (x - 2)(x + 4)$
- $(x - y)^3 + y^3$   $(x - y + y)(x - y)^2 + x - y + y^2 = x(x^2 - 2xy + y^2 + x - y + y^2) = x(x^2 - 2xy + 2y^2 + x - y)$
- $2a^2(x + 1) - 17a(x + 1) + 30(x + 1)$   $(x + 1)(2a^2 - 17a + 30) = (x + 1)(2a - 5)(a - 6)$
- $9(2a + b)^2 + 6(2a + b) - 8$   $9u^2 + 6u - 8 = 9u^2 + 12u - 6u - 8 = 3u(3u + 4) - 2(3u + 4) = (3u - 2)(3u + 4) = (6a + 3b - 2)(6a + 3b + 4)$

13.  $(x^3 - 1)(x^3 + 1) = (x + 1)(x^2 + x + 1)(x - 1)(x^2 - x + 1)$