Factor out the greatest common factor.

1. $3x^4 + 9x^3 + 6x^2$.
2. $2x^5 - 4x^3 + 6x^3$.
3. $x^7 + x^6 + x^3$.
4. $2x^5 + 4x^4 - 2x^2 + 2x$.

5. For each of these numbers, list all possible factorings into two integers. (For 6, for example, you would write (1)(6), (-1)(-6), (2)(3), and (-2)(-3).)

a. -4.

b. 3.

c. -8.

d. 12.

e. -9.

6. For each of the following polynomials, list all possible $x$-coefficients for which the polynomial would factor nicely. (For $x^2 + ??x + 6$, the possible nice $x$-coefficients would be $1 + 6 = 7$, $(-1) + (-6) = -7$, $(2) + (3) = 5$, and $(-2) + (-3) = -5$. You would answer 7, -7, 5, and -5.)

a. $x^2 + ??x + 3$.

b. $x^2 + ??x - 4$.

c. $x^2 + ??x - 10$.

d. $x^2 + ??x + 12$.

e. $x^2 + ??x + 25$.

Factor the following polynomials.

7. $x^2 - 8x + 12$.

8. $x^2 + 4x - 5$.

9. $x^2 + 6x + 5$.

10. $x^2 + 11x - 12$.