

MTH 28.5, Factoring

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1. Factor by identifying the common factor of all the terms::

- (a) $-3x^4 + 6x^2$.
- (b) $-15a^4x^3y + 30a^4x^2z$.
- (c) $12x^4 - 8x^3 - 6x$.
- (d) $-28x^2y^3z^5 - 12x^4z^4 + 4x^3z^3$.
- (e) $2xz - yz - 6x + 3y$.
- (f) $-9s^2t^2w + 6s^3tw - 12s^5t^5$.

2. Factor by grouping:

- (a) $xy + 3x + y + 3$.
- (b) $3ab - a - 3b + 1$.
- (c) $3ac - bc - 15ad + 5bd$.
- (d) $4p^2sx - 10p^2sy + 10qtx - 25qty$.
- (e) $6ac + 3bc + 4ad + 2bd$
- (f) $3x^3z - 6sx^2 - xyz + 2sy$.

3. Factor *completely*. After each step, check whether any of the factors can be factored further.

- (a) $2xz - yz - 6x + 3y$.
- (b) $2px - 3qx + 10py - 15qy$.
- (c) $3ax - 6bx + 3cx - ay + 2by - cy$.
- (d) $x^2 + 11x + 24$.
- (e) $t^2 + 3t - 10$.
- (f) $x^2 + 10x + 5$.
- (g) $x^2 - 10x + 21$.
- (h) $x^2 + 11x - 60$.
- (i) $5y^2 + 25y - 70$.
- (j) $x^4 - 11x^3 + 24x^2$.
- (k) $6p^2 - 17p + 5$.
- (l) $3x^2 + 14x + 8$.
- (m) $-2x^2 + 13x - 15$.
- (n) $5x^2 + 7x + 3$.
- (o) $28x^2 + 17x - 3$.
- (p) $2x^2 - 5xy - 3y^2$.

- (q) $4p^2q^2 - 22pq^2 - 12q^2$.
- (r) $x^2y - 3xy - 18y + 6x - 2x^2 + 36$.
- (s) $px^2 + qx^2 + 2px + 2qx - 15p - 15q$.

4. Each of the following trinomials is a perfect square. Find the unknown coefficient (a , b , or c) and then factor.

- (a) $x^2 - bx + 121$.
- (b) $ax^2 + 200xy + 25y^2$.
- (c) $49p^2 - 42p + c$.

5. Factor *completely*. After each step, check whether any of the factors can be factored further.

- (a) $36x^2 - 84xy + 49y^2$.
- (b) $50p^5 - 40p^4 + 8p^3$.
- (c) $12x^2 - 60xy + 75y^2$.
- (d) $9x^2 - 100$.
- (e) $9x^2 + 25$.
- (f) $49x^2 - y^2$.
- (g) $27x^3 - 75x$.
- (h) $81p^4 - 256q^4$.

6. Factor *completely*:

- (a) $7x^3 - 28x$.
- (b) $2x^4 - 7x^3 - 4x^2$.
- (c) $x^4 - 2x^2 + 1$.
- (d) $x^4y^2z - x^4z^3 + 8xz^3 - 8xzy^2$
- (e) $x^4 - 10x^2 + 9$
- (f) $3x^3 + 13x^2 + 4x$.
- (g) $2x^5 - 1250x$.
- (h) $4x^4 - 25x^2 + 36$.
- (i) $x^2y^4 - 9x^2 + y^4 - 9$.
- (j) $9x^2 - x^2y^2 + 4y^2 - 36$.
- (k) $4x^2 - 4x + 1 - y^2$.
- (l) $4x^2y^2 - 12xy^2 + 9y^2 + 108x - 36x^2 - 81$.
- (m) $-9x^2y^4 + 12xy^4 + 9x^4 - 4y^4 - 12x^3 + 4x^2$.
- (n) $a^2x^2 - b^2x^2 - 5a^2x + 5b^2x + 6a^2 - 6b^2$.