Fifteenth Set of Homework for Math 05

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Please note: You should fully justify your answers.

1 Factoring quadratic trinomials

1. Factor completely:
   - (a) $4x^2 + 4x - 3$ $(2x - 1)(2x + 3)$
   - (b) $x^2 + 4x - 21$ $(x - 3)(x + 7)$
   - (c) $x^2 - 10x + 25$ $(x - 5)^2$
   - (d) $3x^2 + 5x - 2$ $(3x - 1)(x + 2)$
   - (e) $-x^2 + x + 6$ $(3 - x)(x + 2)$
   - (f) $x^2 + 5x + 6$ $(x + 2)(x + 3)$
   - (g) $x^2 - 5x + 6$ $(x - 2)(x - 3)$
   - (h) $-x^2 - x + 6$ $(x + 3)(2 - x)$
   - (i) $x^2 - 13x + 42$ $(x - 6)(x - 7)$
   - (j) $x^2 - x - 42$ $(x + 6)(x - 7)$
   - (k) $x^2 + 8x + 12$ $(x + 2)(x + 6)$
   - (l) $15x^2 - 23x + 4$ $(3x - 4)(5x - 1)$
   - (m) $-6x^2 + 11x + 7$ $(7 - 3x)(2x + 1)$
   - (n) $-x^2 - 12x - 35$ $(5 - x)(x - 7)$
   - (o) $x^2 - x - 56$ $(x - 8)(x + 7)$
   - (p) $x^2 + 8x - 9$ $(x - 1)(x + 9)$
   - (q) $x^2 - 6x + 9$ $(x - 3)^2$
   - (r) $9x^2 + 12x + 4$ $(3x + 2)^2$
   - (s) $x^2 - 17x + 60$ $(x - 5)(x - 12)$
   - (t) $x^2 + 17x - 60$ $(x - 3)(x + 20)$
   - (u) $x^2 + 21x - 100$ $(x - 4)(x + 25)$
   - (v) $21x^2 + 25x - 4$ $(7x - 1)(3x + 4)$

2 Factoring using identities

1. Factor completely:
   - (a) $x^2 - 81$ $(x - 9)(x + 9)$
   - (b) $9x^2 - 100$ $(3x - 10)(3x + 10)$
   - (c) $49x^2 - 1$ $(7x - 1)(7x + 1)$
   - (d) $16x^2 - 25y^2$ $(4x - 5y)(4x + 5y)$
   - (e) $-b^2 + 36a^2$ $(6a - b)(6a + b)$
   - (f) $x^3 + 27$ $(x + 3)(x^2 - 3x + 9)$
   - (g) $x^3 - 8$ $(x - 2)(x^2 + 2x + 4)$
   - (h) $x^4 - 81$ $(x + 3)(x - 3)(x^2 + 9)$
   - (i) $a^6 - b^6$ $(a - b)(a + b)(a^2 + ab + b^2)(a^2 - ab + b^2)$

3 Review of factoring

1. Factor the following polynomials as much as you can. If you think that a polynomial is irreducible state so and explain why.

   (a) $7x^3 - 28x$ $7x(x+2)(x-2)$

   (b) $5x^2 - 9x$ $x(5x-9)$

   (c) $x^2 + 1$ Irreducible

   (d) $2x^4 - 7x^3 - 4x^2$ $x^2(x-4)(2x+1)$

   (e) $9x^2 - x^2y^2 + 4y^2 - 36$ $(x+2)(2-x)(y+3)(y-3)$

   (f) $x^4y^2z - x^4z^3 + 8xz^3 - 8xzy^2$ $xz(z+y)(x^2+2x+4)(x-2)(y-z)$

   (g) $x^4 - 10x^2 + 9$ $(x+1)(x+3)(x-1)(x-3)$

   (h) $4x^4 - 25x^2 + 36$ $(x+2)(x-2)(2x+3)(2x-3)$

   (i) $x^4 - 81$ $(x+3)(x-3)(x^2+9)$

   (j) $4x^2y^2 - 12xy^2 + 9y^2 + 108x - 36x^2 - 81$ $(y+3)(y-3)(2x-3)^2$