Worksheet #15 — General Factoring

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Completely factor each of the following.

(1) $4\,x\,y + 8\,x^2$

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

(3) $x^2 - 49$

(4) $x^2 - x - 6$

(5) $2\,x^2 + 6\,x + 4$

(6) $x^2 - a^2$

(7) $-z^2 + 9$

(8) $x\,y^2 - 4\,x$

(9) $a\,x^2 + 7\,a\,x + 12\,a$

(10) $2\,x^3 - 4\,x^2 - 30\,x$

(11) $-y^2 - x\,y + 2\,x^2$

(12) $x^2 + 4$

(13) $x^2 + x$

(14) $3\,x^2 - 6\,x - 9$

(15) $x^2 - 6\,x + 9$

(16) $4\,x^2 - 9$

(17) $4\,y^2 - 4\,x\,y + x^2$

(18) $3\,a\,y^2 - 12\,a\,x\,y + 12\,a\,x^2$

(19) $9\,a^3\,b - 3\,a$

(20) $a(x+2) - b(x+2)$

(21) $4\,y^2 - 12\,y + 9$

(22) $6\,x^3 - 10\,x^2 + 4\,x$

(23) $2\,y^2 - x\,y - x^2$

(24) $-2\,a\,y^2 + 2\,a\,x^2$

(25) $6\,x^2 - 21\,x + 9$

(26) $4\,a^2 - 4\,a - 3$

(27) $x^2 - a\,x - 2\,a^2$

(28) $x^2 + 4\,x + 4$

(29) $-9\,x^3\,y^4 - 3\,x^2\,y^4 + 6\,x^4\,y^3$

(30) $4\,x^3 - 4\,x^2 + x$

(31) $6\,x^2 + 5\,x - 6$

(32) $4\,x^2 - 4\,x + 1$

(33) $-6\,x\,y^3 + 3\,x^2\,y^2 + 3\,x^3\,y$

(34) $7\,x^2 - 23\,x + 6$

(35) $4\,x^4 - 12\,x^2 + 9$

(36) $x^2 - x - 6$

(37) $2\,x^2\,y - 8\,y - 3\,x^2 + 12$

(38) $x^2 - 5\,x - 14$

(39) $-x^2 - 3\,x + 10$

(40) $36\,x^2\,y + 42\,x\,y - 30\,y$

(41) $2\,b\,x + a\,x - 2\,b - a$

(42) $x^2 - (y+2)^2$

(43) $3\,x^4 - x^2 - 2$

(44) $3\,x^5 - x^3 - 2\,x$

(45) $2\,y^2 - 13\,y + 20$

(46) $x\,y^4 - 2\,x\,y^2 + x$

(47) $2\,x^4 - 9\,x^3 + 9\,x^2$

(48) $-4\,b^2 + 3\,a\,b + a^2$

(49) $2\,x^2 + 3\,x - 2$

(50) $-y^2 + x^2$

(51) $4\,a\,b\,x + 8\,b\,x - 12\,a\,x - 24\,x$

(52) $(x+1)^2 - y^2$

(53) $x^3 - 27$

(54) $-8\,b + 4\,a$

(55) $8\,x^3 - 1$

(56) $x^4 - 81$

(57) $\dfrac{x^2}{3} - \dfrac{7\,x}{3} + \dfrac{10}{3}$

(58) $7\,x^3 + 3\,x^2 + x$

(59) $x^2 - 8\,x + 12$

(60) $x^6 - 3\,x^3 - 4$

(61) $2\,x^2\,y^2 - 2\,x\,y^2$

(62) $2\,y^2 - 2\,y - 12$

(63) $12\,y^4 - 7\,x^2\,y^2 + x^4$

(64) $3\,x^3 - 6\,x^2 - 15\,x$

(65) $-y^2 - y + 6$

(66) $x^2 - x - 15$

(67) $4\,x^2 + 4\,x - a^2 + 1$

(68) $2\,x^2 - 2\,x - 4$

(69) $2\,x^2 + x - 1$

(70) $(x+1)^2 - y^2$

(71) $2\,a\,x + 2\,x + 3\,a + 3$

(72) $a^2\,x + 2\,a\,x + x$

(73) $x^{\frac{2}{3}} + x^{\frac{1}{3}} - 6$

(74) $-y^2 - 2\,y + x^2 + 4\,x + 3$

(75) $a^2 - (y-1)^2$

(76) $2\,x^4 - 13\,x^2 + 20$

(77) $54\,a^4 - 16\,a$

(78) $2\,b^2 + 5\,a\,b + 2\,a^2$

Answers: (1) $4\,x\,(2\,x+y)$ (2) $(x-1)\,(x+2)$ (3) $(x-7)(x+7)$ (4) $(x-3)\,(x+2)$

(5) $2\,(x+1)\,(x+2)$ (6) $(x-a)\,(x+a)$ (7) $(3-z)\,(3+z)$ (8) $x\,(y-2)\,(y+2)$

(9) $a\,(x+3)\,(x+4)$ (10) $2\,x\,(x-5)\,(x+3)$ (11) $(x-y)\,(2\,x+y)$ (12) Does not factor

(13) $x\,(x+1)$ (14) $3\,(x+1)\,(x-3)$ (15) $(x-3)^2$ (16) $(2\,x-3)\,(2\,x+3)$ (17) $(x-2\,y)^2$

(18) $3\,a\,(2\,x-y)^2$ (19) $3\,a\,\left(3\,a^2\,b-1\right)$ (20) $(x+2)\,(a-b)$ (21) $(2\,y-3)^2$ (22) $2\,x\,(3\,x-2)\,(x-1)$

(23) $-(x-y)\,(x+2\,y)$ (24) $2\,a\,(x-y)\,(x+y)$ (25) $3\,(x-3)\,(2\,x-1)$ (26) $(2\,a+1)\,(2\,a-3)$

(27) $(x-2\,a)\,(x+a)$ (28) $(x+2)^2$ (29) $3\,x^2\,y^3\,\left(2\,x^2-y-3\,x\,y\right)$ (30) $x\,(2\,x-1)^2$

(31) $(3\,x-2)\,(2\,x+3)$ (32) $(2\,x-1)^2$ (33) $3\,x\,y\,(x-y)\,(x+2\,y)$ (34) $(7\,x-2)\,(x-3)$

(35) $\left(2\,x^2-3\right)^2$ (36) $(x-3)\,(x+2)$ (37) $(2\,y-3)\,(x-2)\,(x+2)$ (38) $(x-7)\,(x+2)$

(39) $-(x-2)\,(x+5)$ (40) $6\,y\,(2\,x-1)\,(3\,x+5)$ (41) $(x-1)\,(a+2\,b)$ (42) $(x-y-2)\,(x+y+2)$

(43) $(x-1)\,(x+1)\,\left(3\,x^2+2\right)$ (44) $x\,(x-1)\,(x+1)\,\left(3\,x^2+2\right)$ (45) $(y-4)\,(2\,y-5)$

(46) $x\,(y-1)^2\,(y+1)^2$ (47) $x^2\,(x-3)\,(2\,x-3)$ (48) $(a-b)\,(a+4\,b)$ (49) $(2\,x-1)\,(x+2)$

(50) $(x+y)\,(x-y)$ (51) $4\,x\,(a+2)\,(b-3)$ (52) $(x+1-y)\,(x+1+y)$ (53) $(x-3)\,\left(x^2+3\,x+9\right)$

(54) $4\,(a-2\,b)$ (55) $(2\,x-1)\,\left(4\,x^2+2\,x+1\right)$ (56) $(x-3)\,(x+3)\,\left(x^2+9\right)$ (57) $\frac{1}{3}\,(x-2)\,(x-5)$

(58) $x\,\left(7\,x^2+3\,x+1\right)$ (59) $(x-2)\,(x-6)$ (60) $\left(x^3-4\right)\,\left(x^3+1\right)$ (61) $2\,x\,y^2\,(x-1)$

(62) $2\,(y+2)\,(y-3)$ (63) $(x-2\,y)\,(x+2\,y)\,\left(x^2-3\,y^2\right)$ (64) $3\,x\,\left(x^2-2\,x-5\right)$ (65) $-(y-2)\,(y+3)$

(66) Does not factor (67) $(2\,x+1-a)\,(2\,x+1+a)$ (68) $2\,(x+1)\,(x-2)$ (69) $(2\,x-1)\,(x+1)$

(70) $(x+1-y)\,(x+1+y)$ (71) $(2\,x+3)\,(a+1)$ (72) $x\,(a+1)^2$ (73) $\left(x^{\frac{1}{3}}-2\right)\,\left(x^{\frac{1}{3}}+3\right)$

(74) $(x-y+1)\,(x+y+3)$ (75) $(a-y-1)\,(a-y+1)$ (76) $(x-2)\,(x+2)\,\left(2\,x^2-5\right)$

(77) $2\,a\,(3\,a-2)\,\left(9\,a^2+6\,a+4\right)$ (78) $(a+2\,b)\,(2\,a+b)$