

Factorization

Solution

- $3a + 6b + 12c = 3(a + 2b + 4c)$
 - $-4x^2 - 6y - 20y^2 = -2(2x^2 + 3y + 10y^2)$
 - $-27 - 15t - 18t^2 = -3(9 + 5t + 6t^2)$
- $$\begin{aligned} abc - 2c + ab - 2 &= c(ab - 2) + ab - 2 \\ &= (ab - 2)(c + 1) \end{aligned}$$
 - $$\begin{aligned} x^2 + y - xy - x &= x^2 - xy + y - x \\ &= x(x - y) - (x - y) \\ &= (x - y)(x - 1) \end{aligned}$$
- $$\begin{aligned} ab + 1 + a + b &= ab + a + b + 1 \\ &= a(b + 1) + b + 1 \\ &= (b + 1)(a + 1) \end{aligned}$$
 - $$\begin{aligned} mn + 1 - m - n &= mn - m - n + 1 \\ &= m(n - 1) - (n - 1) \\ &= (n - 1)(m - 1) \end{aligned}$$
- $$\begin{aligned} 2ab - bc + cd - 2ad &= b(2a - c) + d(c - 2a) \\ &= (2a - c)(b - d) \end{aligned}$$
 - $$\begin{aligned} 3mn - 2m + 4 - 6n &= m(3n - 2) + 2(2 - 3n) \\ &= (3n - 2)(m - 2) \end{aligned}$$
- $$\begin{aligned} 16m^2n - 4m^3 &= 4m^2(4n - m) \end{aligned}$$
 - $$\begin{aligned} 3a(b - 2c) - 2(b - 2c) &= (b - 2c)(3a - 2) \end{aligned}$$
 - $$\begin{aligned} 12x^2y^2 + 4xy^3 - 6x^2y &= 2xy(6xy + 2y^2 - 3x) \end{aligned}$$
- $$\begin{aligned} 4b^2 - 49 &= (2b)^2 - 7^2 \\ &= (2b + 7)(2b - 7) \end{aligned}$$
 - $$\begin{aligned} m^2 - 9n^2 &= m^2 - (3n)^2 \\ &= (m + 3n)(m - 3n) \end{aligned}$$
- $$\begin{aligned} 64r^2 - 25s^2 &= (8r)^2 - (5s)^2 \\ &= (8r + 5s)(8r - 5s) \end{aligned}$$
- $$\begin{aligned} a^2 - 12a + 36 &= a^2 - 2(a)(6) + 6^2 \\ &= (a - 6)^2 \end{aligned}$$
 - $$\begin{aligned} 81 + 18b + b^2 &= b^2 + 18b + 81 \\ &= b^2 + 2(b)(9) + 9^2 \\ &= (b + 9)^2 \end{aligned}$$
 - $$\begin{aligned} c^2 - 22c + 121 &= c^2 - 2(c)(11) + 11^2 \\ &= (c - 11)^2 \end{aligned}$$
- $$\begin{aligned} 3t^2 - 30t + 75 &= 3(t^2 - 10t + 25) \\ &= 3[t^2 - 2t(5) + 5^2] \\ &= 3(t - 5)^2 \end{aligned}$$
 - $$\begin{aligned} 96 + 48y + 6y^2 &= 6(y^2 + 8y + 16) \\ &= 6[y^2 + 2y(4) + 4^2] \\ &= 6(y + 4)^2 \end{aligned}$$
 - $$\begin{aligned} 16y^2 - 36x^2 &= 4(4y^2 - 9x^2) \\ &= 4[(2y)^2 - (3x)^2] \\ &= 4(2y + 3x)(2y - 3x) \end{aligned}$$
- $$\begin{aligned} 25m^2 - 36n^2 - 5m - 6n &= (5m)^2 - (6n)^2 - 5m - 6n \\ &= (5m + 6n)(5m - 6n) - (5m + 6n) \\ &= (5m + 6n)(5m - 6n - 1) \end{aligned}$$
 - $$\begin{aligned} 81x^4 - 256 &= (9x^2)^2 - (16)^2 \\ &= (9x^2 + 16)(9x^2 - 16) \\ &= (9x^2 + 16)[(3x)^2 - 4^2] \\ &= (9x^2 + 16)(3x + 4)(3x - 4) \end{aligned}$$
- $$\begin{aligned} x^2 - y^2 + y + x &= (x^2 - y^2) + (x + y) \\ &= (x + y)(x - y) + (x + y) \\ &= (x + y)(x - y + 1) \end{aligned}$$
 - $$\begin{aligned} 9m^2 - 9 + 24mn + 16n^2 &= (9m^2 + 24mn + 16n^2) - (3)^2 \\ &= (3m + 4n)^2 - (3)^2 \\ &= (3m + 4n + 3)(3m + 4n - 3) \end{aligned}$$

Factorization

11. (a) $6(x-y)^2 + 3(x-y)(k+2)$
 $= 3(x-y)[2(x-y) + (k+2)]$
 $= 3(x-y)(2x-2y+k+2)$
- (b) $(2a+c)(a-b) + (b-a)(c-2a)$
 $= (a-b)(2a+c-c+2a)$
 $= 4a(a-b)$
- (c) $am - bm - an + bn + a - b$
 $= m(a-b) + n(-a+b) + a - b$
 $= (a-b)(m-n+1)$
- (d) $(5x-2)(y-3k) - (2-5x)(3y-k)$
 $= (5x-2)(y-3k+3y-k)$
 $= (5x-2)(4y-4k)$
 $= 4(5x-2)(y-k)$