

## Factorization I

01. a.  $8a + 2b + 9a + 7c - 6 - 4c$

$$= 8a + b + 8c$$

b.  $3ab + b + 5a + 8b + 2ba$

$$= 5ab + 3b + 5a$$

c.  $7p + 3pq - 2p + 2pq + 8q$

$$= 5p + 5pq + 8q$$

d.  $3x + 2y - 3x + xy + 2y + 2xy$

$$= 2x + 3y + 2xy$$

e.  $3p - 2q + p + q$

$$= 4p - q$$

f.  $3p^2 + 2pq - q^2 - 7pq$

$$= 3p^2 - 5pq - q^2$$

$$= \text{---}$$

g.  $5p - 7q - 2p - 3q + 3pq$

$$= 3p - 10q + 3pq$$

02. a = 2    b = 1

a.  $a^3 = 2^3 = 8$

b.  $5a^2 = 5 \times 2^2 = 5 \times 4 = 20$

c.  $(5a)^2 = (5 \times 2)^2 = (10)^2 = 100$

d.  $b^2 = 1^2 = 1$

e.  $2a^2 + 3b^2 = 2 \times 2^2 + 3 \times 1^2 = 2 \times 4 + 3 \times 1 = 8 + 3 = 11 //$

03. a.  $(2x)(3y) = 6xy$

b.  $(3x^2)(5xy) = 15x^3y$

c.  $3(2a + 3b) = 6a + 9b$

d.  $2a(3a + 5b) = 6a^2 + 10ab$

e.  $2p(3p^2 + 2pq + q^2) = 6p^3 + 4p^2q + 2pq^2$

f.  $2x^2(3x + 2xy + y^2) = 6x^3 + 4x^3y + 2x^2y^2$

g.  $5(2g + 3h) = 10g + 15h$

$$h. \quad g(8g - 2h) = 3g^2 - 2gh$$

$$i. \quad 3k^2(2k - 5m + 2n) = 6k^3 - 15k^2m + 6k^2n$$

$$j. \quad 3k - (2m + 3n - 5k)$$

$$3k - 2m - 3n + 5k = 8k - 2m - 3n$$

$$k. \quad 3x(2x + 3y) + 4y(x + 7y)$$

$$(6x^2 + 9xy) + (4yx + 28y^2)$$

$$6x^2 + 9xy + 4xy + 28y^2$$

$$6x^2 + 13xy + 28y^2$$

$$l. \quad sp^2(2p + 3q) + q^2(3p + 5q) + pq(p + 2q)$$

$$10p^3 + 15p^2q + 3pq^2 + 3q^3 + p^2q + 2pq^2$$

$$= 10p^3 + 16p^2q + 5pq^2 + 3q^3$$

$$O4 \quad a = 2$$

$$b = 3$$

$$c = 4$$

$$d = 5$$

$$e = 0$$

$$a \quad ab + cd = (2 \times 3) + (4 \times 5)$$

$$= 6 + 20$$

$$= 26$$

$$b \quad ab^2e = 2 \times 3^2 \times 0$$

$$= 2 \times 9 \times 0$$

$$= 18 \times 0$$

$$= 0$$

$$c \quad ab^2d = 2 \times 3^2 \times 5$$

$$= 2 \times 9 \times 5$$

$$= 18 \times 5$$

$$= 90$$

$$d \quad (cabd)^2 = (2 \times 3 \times 5)^2$$

$$= (6 \times 5)^2$$

$$= (30)^2 = 30^2$$

$$\begin{aligned}
 e. & a(b+cd) \\
 & 2(3+(4 \times 5)) \\
 & 2(3+20) \\
 & 2(23) \\
 & = 46
 \end{aligned}$$

$$\begin{aligned}
 f. & ab^2d + c^3 \\
 & 2 \times 3^2 \times 5 + 4^3 \\
 & 2 \times 9 \times 5 + 64 \\
 & 18 \times 5 + 64 \\
 & 90 + 64 = 154
 \end{aligned}$$

$$\begin{aligned}
 g. & ab + d - c \\
 & (2 \times 3) + 8 - 4 \\
 & 6 + 8 - 4 \\
 & 11 - 4 = 7 //
 \end{aligned}$$

$$\begin{aligned}
 h. & a(b+d) - c \\
 & 2(3+5) - 4 \\
 & (6+10) - 4 \\
 & 16 - 4 = 12 //
 \end{aligned}$$

$$\text{DS} \quad a = 3, b = 4, c = 1, d = 5, e = 0$$

$$a^2 = 3^2 = 9$$

$$(3b)^2 = (3 \times 4)^2 = (12)^2 = 12^2 //$$

$$\begin{aligned}
 3b^2 &= 3 \times 4^2 = 3 \times 16 \\
 &= 48
 \end{aligned}$$

$$d \quad c^2 = 1^2 = 1$$

$$\begin{aligned}
 e \quad ab + c &= (3 \times 4) + 1 \\
 &= 12 + 1 = 13 //
 \end{aligned}$$

$$\begin{aligned}
 f \quad bd - ac &= (4 \times 5) - (3 \times 1) \\
 &= 20 - 3 \\
 &= 17 //
 \end{aligned}$$



$$\begin{aligned}
 g \quad b(d-ao) &= 4(5-(3 \times 1)) \\
 &= 4(5-3) \\
 &= 4(2) \\
 &= 8 //
 \end{aligned}$$

$$\begin{aligned}
 h \quad d^2 - b^2 &= 5^2 - 4^2 \\
 &= 25 - 16 \\
 &= 9 //
 \end{aligned}$$

$$\begin{aligned}
 i \quad (d-b)(d+b) &= (5-4)(5+4) \\
 &= (1)(9) \\
 &= 9 //
 \end{aligned}$$

$$\begin{aligned}
 j \quad d^2 + b^2 &= 25 + 16 \\
 &= 41 //
 \end{aligned}$$

$$\begin{aligned}
 k \quad (d+b)(d+b) &= (5+4)(5+4) \\
 &= (9)(9) \\
 &= 81 //
 \end{aligned}$$

$$\begin{aligned}
 l \quad a^2b + c^2d &= (3^2 \times 4) + (1^2 \times 5) \\
 &= (9 \times 4) + (1 \times 5) \\
 &= 36 + 5 \\
 &= 41 //
 \end{aligned}$$

$$\begin{aligned}
 m \quad se \quad (a^2 - 3b^2) &= 5 \times 0 (3^2 - (3 \times 4^2)) \\
 &= 0 (9 - (3 \times 16)) \\
 &= 0 (9 - 48) \\
 &= 0 (39) \\
 &= 0 //
 \end{aligned}$$

$$\begin{aligned}
 n \quad a^b + d^a &= 3^4 + 5^3 \\
 &= 81 + 125 \\
 &= 206
 \end{aligned}$$

6

$$a. 3a(2b+3c) + 2a(b+5c)$$

$$6ab + 9ac + 2ab + 10ac$$

$$= 8ab + 19ac$$

$$b. 2xy(3x^2 + 2xy + y^2)$$

$$6x^3y + 4x^2y^2 + 2xy^3$$

$$c. 5p(2p+3q) + 2q(3p+q)$$

$$10p^2 + 15pq + 6pq + 2q^2$$

$$10p^2 + 21pq + 2q^2$$

$$d. 2c^2(3c+2d) + 5d^2(2c+d)$$

$$= 6c^3 + 4c^2d + 10d^2c + 5d^3$$

$$7. a. 2x - (x-2y) + 9y$$

$$2x - x + 2y + 9y$$

$$x + 7y$$

$$b. 4(3a-2b) - 6(2a-b)$$

$$12a - 8b - 12a + 6b$$

$$-2b$$

$$c. 6(2c+d) - 2(3c-d) + 5$$

$$62c +$$

$$12c + 6d - 6c + 2d + 5$$

$$6c + 8d + 5$$

$$d. 6a - 2(3a-5b) - (a+4b)$$

$$6a - 6a + 10b - a - 4b$$

$$10b - 5b - a = 5b - a$$

$$e. 3x(2x-3y+2z) - 4x(2x+5y-3z)$$

$$6x^2 - 9xy + 6xz - 8x^2 - 20xy + 12xz$$

$$-2x^2 - 29xy + 18xz$$

$$= -(2x^2 + 29xy - 18xz)$$

$$= -1(2x^2 + 29xy - 18xz)$$

$$= -x(2x + 29y - 18z)$$

$$f. 2xy(3x-4y) - 5xy(2x-y)$$

$$6x^2y - 8xy^2 - 10x^2y + 5xy^2$$

$$-4x^2y - 3xy^2$$

$$= -1(4x^2y + 3xy^2)$$

$$= -x(4xy + 3y^2)$$

$$g. 2a^2(3a-2ab) - 5ab(2a^2-4ab)$$

$$6a^3 - 4a^3b - 10a^3b + 20a^2b^2$$

$$6a^3 - 14a^3b + 20a^2b^2$$

$$= 2a^2(3a - 7ab + 10b^2)$$

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$$h. \quad -3p \left( \right.$$

$$-3p - (p+q) + 2q(p-3)$$

$$-3p - p - q + 2pq - 6q$$

$$-4p - 7q + 2pq$$