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Ex 19 B

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a) $3a+4b+7c$, $-5a+3b-6c$ and $4a-2b-4c$

Ans → $(3a+4b+7c)+(-5a+3b-6c)+(4a-2b-4c)$

$= 3a+4b+7c-5a+3b-6c+4a-2b-4c$

$=(3a-5a+4a)+(4b+3b-2b)+(7c-6c-4c)$

$=2a+5b-3c$

b) $(2x^2+xy-y^2)+(-x^2+2xy+3y^2)+(3x^2-10xy+4y^2)$

$=2x^2+xy-y^2-x^2+2xy+3y^2+3x^2-10xy+4y^2$

$=(2x^2-x^2+3x^2)+(xy+2xy-10xy)-(y^2+3y^2+4y^2)$

$=4x^2-7xy+6y^2$

c) $(x^2-x+1)+(-5x^2+2x-2)+(3x^2-3x+1)$

$= x^2-x+1-5x^2+2x-2+3x^2-3x+1$

$=(x^2-5x^2+3x^2)+(-x+2x-3x)+(1-2+1)$

$=-x^2-2x$

d) $a^2-ab+bc$, $2ab+bc-2a^2$ and $-3bc+3a^2+ab$.

Ans → $=(a^2-ab+bc)+(2ab+bc-2a^2)+(-3bc+3a^2+ab)$

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$= (a^2 - 2a^2 + 3a^2) + (-ab + 2ab + ab) + (bc + bc - 3bc)$

$= 2a^2 + 2ab - 1bc$

v) $4x^2 + 7 - 3x$, $4x - x^2 + 8$ and $-10 + 5x - 2x^2$

Ans → $(4x^2 + 7 - 3x) + (4x - x^2 + 8) + (-10 + 5x - 2x^2)$

$= 4x^2 + 7 - 3x + 4x - x^2 + 8 - 10 + 5x - 2x^2$

$= (4x^2 - x^2 - 2x^2) + (7 + 8 - 10) + (-3x + 4x + 5x)$

$= x^2 + 5 + 6x$

vi) $3x + 4xy - y^2$, $xy - 4x + 2y^2$ and $3y^2 - xy + 6x$.

Ans → $(3x + 4xy - y^2) + (xy - 4x + 2y^2) + (3y^2 - xy + 6x)$

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

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

$= 5x + 4xy + 4y^2$

2) Add the following expressions.

i) $-17x^2 - 2xy + 23y^2$, $-9y^2 + 15x^2 + 7xy$ and $13x^2 + 3y^2 - 4xy$.

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Ans → $=(-17x^2-2xy+23y^2)+(-9y^2+15x^2+7xy)+(13x^2+3y^2-4xy)$.

$=17x^2-2xy+23y^2-9y^2+15x^2+7xy+13x^2+3y^2-4xy$.

$=(17x^2+15x^2+13x^2)+(-2xy+7xy-4xy)+(23y^2-9y^2+3y^2)$

$=45x^2+xy+17y^2$

ii) $-x^2-3xy+3y^2+8$, $3x^2-5y^2-3+4xy$ and $-6xy+2x^2-2+y^2$

Ans → $=(-x-3xy+3y^2+8)+(3x^2-5y^2-3+4xy)+(-6xy+2x^2-2+y^2)$

$=-x^2-3xy+3y^2+8+3x^2-5y^2-3+4xy-6xy+2x^2-2+y^2$

$=(-x^2+3x^2+2x^2)+(-3xy+4xy-6xy)+(3y^2-5y^2+y^2)+(8-3-2)$

$=4x^2-5xy-y^2+3$

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iii) a^3-2b^3+a, b^3-2a^3+b and $-2b+2b^3-5a+4a^3$.

Ans) $=(a^3-2b+a)+(b^3-2a^3+b)+(-2b+2b^3-5a+4a^3)$

$=a^3-2b+a+b^3-2a^3+b-2b+2b^3-5a+4a^3$.

$=(a^3-2a^3+4a^3)+(-2b+b-2b)+(a-5a)+$

(b^3+2b^3)

$=3a^3-3b-4a+3b^3$

3) Evaluate

i) $3a-(a+2b)$

Ans) $3a-a-2b$

$=2a-2b$

ii) $(5x-3y)-(x+y)$

Ans) $=5x-3y-x-y$

$=(5x-x)+(-3y-y)$

$=4x-4y$

iii) $(8a+15b)-(3b-7a)$

Ans) $=8a+15b-3b+7a$

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$= (8a + 7a) + (15b - 3b)$

$= 15a + 12b$

iv) $(8x + 7y) - (4y - 3x)$

Ans → $= 8x + 7y - 4y + 3x$

$= (8x + 3x) + (7y - 4y)$

$= 11x + 3y$

v) $7 - (4a - 5)$

Ans → $= 7 - 4a + 5$

$= (7 + 5) - 4a$

$= 12 - 4a$

vi) $(6y - 13) - (4 - 7y)$

Ans → $= 6y - 13 - 4 + 7y$

$= (6y + 7y) + (-13 - 4)$

$= 13y - 17$

4) i ~~iii~~) $5a - 3b + 2c$ from $a - 4b - 2c$

Ans → $= (a - 4b - 2c) - (5a - 3b + 2c)$

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Ans: $a-4b-2c-5a+3b-2c$

$=(a-5a)+(-4b+3b)+(-2c-2c)$

$=-4a-b-4c$

ii) $4x-6y+3z$ from $12x+7y-21z$

Ans: $=(12x+7y-21z)-(4x-6y+3z)$

$=12x+7y-21z-4x+6y-3z$

$=(12x-4x)+(7y+6y)+(-21z-3z)$

$=8x+13y-24z$

iii) $5-a-4b+4c$ from $5a-7b+2c$.

Ans: $=(5a-7b+2c)-(5-a-4b+4c)$

$=5a-7b+2c-5+a+4b-4c$

$=(5a+a)+(-7b+4b)+(2c-4c)-5$

$=6a-3b-2c-5$

iv) $-8x-12y+17z$ from $x-y-z$.

Ans: $=(x-y-z)-(-8x-12y+17z)$

$=x-y-z+8x+12y-17z$

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$= (x + 8x) + (-y + 12y) + (-z - 17z)$

$= 9x + 11y - 18z$

iv) $2ab + cd - ac - 2bd$ from $ab - 2cd + 2ac + bd$

Ans → $(ab - 2cd + 2ac + bd) - (2ab + cd - ac - 2bd)$

$= ab - 2cd + 2ac + bd - 2ab - cd + ac + 2bd$

$= (ab - 2ab) + (-2cd - cd) + (2ac + ac) + (bd + 2bd)$

$= -ab - 3cd + 3ac + 3bd$

5) i) Take $-ab + bc - ca$ from $bc - ca + ab$

Ans → $= (bc - ca + ab) - (-ab + bc - ca)$

$= bc - ca + ab + ab - bc + ca$

$= (bc - bc) + (-ca + ca) + (ab + ab)$

$= 2ab$

ii) Take $5x + 6y - 3z$ from $3x + 5y - 4z$

Ans → $= (3x + 5y - 4z) - (5x + 6y - 3z)$

$= -5x - 6y + 3z + 3x + 5y - 4z$

$= (-5x + 3x) + (-6y + 5y) + (3z - 4z)$

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$= -2x - y - z$

iii) Take $\frac{-3}{2}p + q - r$ from $\frac{1}{2}p - \frac{1}{3}q - \frac{3}{2}r$.

Ans → $= \left(\frac{1}{2}p - \frac{1}{3}q - \frac{3}{2}r\right) - \left(\frac{-3}{2}p + q - r\right)$

$= \frac{1}{2}p - \frac{1}{3}q - \frac{3}{2}r + \frac{3}{2}p - q + r$

$= \left(\frac{1}{2}p + \frac{3}{2}p\right) + \left(-\frac{1}{3}q - q\right) + \left(\frac{-3}{2}r + r\right)$

$= \frac{1}{2}p + \frac{3}{2}p = \frac{1+3}{2}p = \frac{4^2}{2^1}p = \frac{2}{1}p = 2p$

$= -\frac{1}{3}q - q = \frac{-1q - 3q}{3} = \frac{-4q}{3} = -\frac{4}{3}q$

$= -\frac{3}{2}r + r = \frac{-3+2r^2}{2} = -\frac{1}{2}r = 2p - \frac{4}{3}q + \frac{1}{2}r$

iv) Take $1 - a + a^2$ from $a^2 + a + 1$

Ans → $(a^2 + a + 1) - (1 - a + a^2)$

$= a^2 + a + 1 - 1 + a - a^2$

$= (a^2 - a^2) + (a + a) + (1 - 1)$

$= 2a$

6) From the sum of $x + y - 2z$ and $2x - y + z$ subtract $x + y + z$

Ans → $x + y - 2z + 2x - y + z = x + 2x + y - y - 2z + z$

$= 3x - z$

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$3x - z - (x + y + z) = 3x - z - x - y - z$

$= 3x - x - z - z - y$

$= 2x - 2z - y$

7) From the sum of $3a - 2b + 4c$ and $3b - 2c$ subtract $a - b - c$

Ans → $= (3a - 2b + 4c) + (3b - 2c)$

$= (-2b + 3b) + (4c - 2c) + 3a$

$= b + 2c + 3a$

$= b + 2c + 3a - (a - b - c)$

$= b + 2c + 3a - a + b + c$

$= (b + b) + (2c + c) + (-a + 3a)$

$= 2b + 3c + 2a$

8) Subtract $x - 2y - z$ from the sum of $3x - y + z$ and $x + y - 3z$

Ans → $= (3x - y + z) + (x + y - 3z)$

$= 3x - y + z + x + y - 3z$

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$= (3x + x) + (-y + y) + (z - 3z)$

$= 4x - 2z$

$= 4x - 2z - (x - 2y - z)$

$= 4x - 2z - x + 2y + z$

$= (4x - x) + (-2z + z) + (2y)$

$= 3x - z + 2y$

9) Subtract the sum of $x + y$ and $x - z$ from the sum of $x - 2z$ and $x + y + z$.

Ans: $= (x - 2z) + (x + y + z)$

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

$= 2x - z + y$

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

$= 2x - z + y - x - y - x + z$

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

$= 0$