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Fundamental Concepts

Ex 11B

1) Fill in the blanks :-

i) $8x + 5x = 13x$

ii) $8x - 5x = 3x$

iii) $6xy^2 + 9xy^2 = \cancel{+6x}\ 15xy^2$

iv) $6xy^2 - 9xy^2 = -3xy^2$

v) The sum of $8a$, $6a$ & $5b$

$= 8a + 6a + 5b$

$= 14a + 5b$

vi) The addition of 5, $7xy$, 6 & $3xy$

$= 5 + 6 + 7xy + 3xy$

$= 11 + 10xy$

vii) $4a + 3b - 7a + 4b$

$= 4a - 7a + 3b + 4b$

$= -3a + 7b$

viii) $-15x + 13x + 8$

$= -2x + 8$

ix) $6x^2y + 13xy^2 - 4x^2y + 2xy^2$

$= 6x^2y - 4x^2y + 13xy^2 + 2xy^2$

$= 2x^2y + 13xy^2 + 2xy^2$

$= 2x^2y + 15xy^2$

x) $16x^2 - 9x^2 = 7x^2$

$25xy^2 - 17xy^2 = 8xy^2$

21) $-9x + 3x + 4x$

$= -9x + 7x$

$= -2x$

ii) $23y^2 + 8y^2 + (-12y^2)$

$= 31y^2 - 12y^2$

$= 19y^2$

iii) $18pq + (-15pq) + 3pq$

$= 18pq + 3pq + (-15pq)$

$= 21pq + (-15pq)$

$= 21pq - 15pq$

$= 6pq$

3i) $3m + 12m - 5m$

$= 15m - 5m$

$= 10m$

ii) $7n^2 - 9n^2 + 3n^2$

$= 7n^2 + 3n^2 - 9n^2$

$= 10n^2 - 9n^2$

$= n^2$

iii) $25zy - 8zy - 6x\ 6zy$

$= 17zy - 6zy$

$= 11zy$

iv) $-5ax^2 + 7ax^2 - 12ax^2$

$= 2ax^2 - 12ax^2$

$= -10ax^2$

v) $-16am + 4mx + 4am - 15mx + 5am$

$= \overset{am}{-16} + 4am + 5am + 4mx - 15mx$

$= \cancel{10} \cancel{-16} + -16am + 9am + 4mx - 15mx$

$= -7am + 4mx - 15mx$

$= -7am - 11mx$

4i) ~~a+b~~ $a+b+2a+3b$

$= 2a+a+b\ a+2a+b+3b$

$= 3a+4b$

ii) $2x+y+3x-y\ 4y$

$= 2x+3x+y-4y$

$= 5x+3y$

iii) $-3a+2b+3a+b$

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

$= 2b+b$

$= 3b$

iv) $4+x+5-2x+6x$

$= 4+5+x-2x+6x$

$= 9+x-2x+6x$

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$= 9 + x - x + 4x$

$= 9 + 5x$

5 i.) $3x + 8y + 7z + 6y + 4z - 2x + 3y - 4x + 6z$

$= 3x - 2x - 4x + 8y + 6y + 3y + 7z + 4z + 6z$

$1x - 4x$

$= 3x + 6x + 8y + 6y + 3y + 7z + 4z + 6z$

$-3x$

$= 9x + 14y + 3y + 7z + 4z + 6z$

$-3x$

$= 9x + 17y + 7z + 4z + 6z$

$-3x$

$= 9x + 17y + 11z + 6z$

$= 9x + 17 + 17z$

5.) $3x + 8y + 7z + 6y + 4z - 2x + 3y - 4x + 6z$

$= 3x - 2x - 4x + 8y + 6y + 3y + 7z + 4z + 6z$

$= 1x - 4x + 8y + 6y + 3y + 7z + 4z + 6z$

$= -3x + 8y + 6y + 3y + 7z + 4z + 6z$

$= -3x + 14y + 3y + 7z + 4z + 6z$

$= -3x + 17y + 7z + 4z + 6z$

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$= -3x + 17y + 7z + 7z + 10z$

$= -3x + 17y + 17z$

ii.) $3a + 5b + 2c + 2a + 3b - c + a + b + c$

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

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

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

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

$= 6a + 9b + 2c - c + c$

$= 6a + 9b + 1c + c$

$= 6a + 9b + 2c$

iii.) $4x^2 + 8xy - 2y^2 + 8xy - 5y^2 + x^2$

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

$= 5x^2 + 8xy + 8xy - 2y^2 - 5y^2$

$= 5x^2 + 16xy - 10y^2 - 7y^2$

iv) $9x^2 - 6x + 7 + 5 - 4x + 6 - 3x^2$

$= 9x^2 - 3x^2 - 6x - 4x + 7 + 5 + 6$

$= 6x^2 - 6x - 4x + 7 + 5 + 6$

$= 6x^2 - 10x + 7 + 5 + 6$

$= 6x^2 - 10x + 12 + 6$

$= 6x^2 - 10x + 18$

v) $5x^2 - 2xy + 3y^2 + (-2x^2) + 5xy + 9y^2 + 3x^2 - xy - 4y^2$

$= 5x^2 - (-2x^2) + 3x^2 - 2xy + 5xy - xy + 3y^2 + 9y^2 - 4y^2$

$= 5x^2 + 2x^2 + 3x^2 - 2xy + 5xy - xy + 3y^2 + 9y^2 - 4y^2$

$= 7x^2 + 3x^2 - 2xy + 5xy - xy + 3y^2 + 9y^2 - 4y^2$

$= 10x^2 - 2xy + 5xy - xy + 3y^2 + 9y^2 - 4y^2$

$= 10x^2 + 3xy - xy + 3y^2 + 9y^2 - 4y^2$

$= 10x^2 + 2xy + 3y^2 + 9y^2 - 4y^2$

$= 10x^2 + 2xy + 12y^2 - 4y^2$

$= 10x^2 + 12xy + 8y^2$

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vi) $a^2+b^2+2ab+2b^2+c^2+2bc+4c^2-a^2+2ac$

$= a^2-a^2+b^2+2b^2+2ab+c^2+4c^2+2bc+2ac$

$= b^2+2b^2+2ab+c^2+4c^2+2bc+2ac$

$= 3b^2+2ab+c^2+4c^2+2bc+2ac$

$= 3b^2+2ab+5c^2+2bc+2ac$

vii) $9ax-6bx+8+4ax+8bx-7+-6ax-4bx-3$

$= 9ax+4ax-6ax-6bx+8bx-4bx+8+(-7)+(-3)-7-3$

$= 13ax-6ax-6bx+8bx-4bx+8-7-3$

$= 7ax-6bx+8bx-4bx+8-7-3$

$= 7ax-6bx+4bx+8-7-3$

$= 7ax+2bx+8-7-3$

$= 7ax+2bx+1-3$

$= 7ax+2bx-2$ $7ax-2bx-2$

ix) $4a^2+5b^2-6ab+3ab+6a^2-2b^2+4b^2-5ab$

$= 4a^2+6a^2+5b^2-2b^2+4b^2-6ab+3ab+5-5ab$

$= 10a^2+5b^2-2b^2+4b^2-6ab+3ab-5ab$

$= 10a^2+3b^2+4b^2-6ab+3ab-5ab$

$= 10a^2+7b^2-6ab+3ab-5ab$

$= 10a^2+7b^2-3ab-5ab$

$= 10a^2+7b^2-8ab$

x) $x^2+x-2+2x-3x^2+5+2x^2-5x+7$

$= x^2+x^2-3x^2+2x^2+x+2x-5x-2+5+7$

$= x^2+x^2-2x^2+2x^2+x+2x-5x-2+5+7$

$= x+2x-5x-2+5+7$

$= x-3x-2+5+7$

$= -2x-2+5+7$

$= -2x-2+12$

$= -2x+10$

xi) $4x^3+2x^2-x+1+2x^3-5x^2-3x+6+x^2+8+5x^3-7x$

$= 4x^3+2x^3+5x^3+2x^2-5x^2+x^2-x-3x-7x+1+6+8$

$= 4x^3+7x^3+2x^2-5x^2+x^2-x-3x-7x+1+6+8$

$= 11x^3+2x^2-5x^2+x^2-x-3x-7x+1+6+8$

$= 11x^3-3x^2+x^2-x-3x-7x+1+6+8$

$= 11x^3-2x^2-x-3x-7x+1+6+8$

$= 11x^3-2x^2-x-10x+1+6+8$

$= 11x^3-2x^2-11x+1+6+8$

$= 11x^3-2x^2-11x+7+8$

$= 11x^3-2x^2-11x+15$

6i) $x+3y$

ii) $-2a+5$

iii) $-4x^2+7x$

iv) $4a-(-7b) = 4a+7b$

v) $x^3+3x^2y+2y^2$

vi) $11-(-by) = 11+by$

7) First side $= 2x+3y$
Second Side $= x+5y$
Third Side $= 7x-2y$
~~Peremi~~ Perimeter $= 2x+3y+x+5y+7x-2y$

$= 2x+3y+x+5y+7x-2y$

$= 2x+x+7x+3y+5y-2y$

$= 3x+7x+3y+5y-2y$

$= 10x+3y+5y-2y$

$= 10x+8y-2y$

$= 10x+6y$

∴ The perimeter is $10x+6y$.

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8.) First First Side = $6a + 9b$
Second side = $8a - 4b$
Perimeter = $6a + 9b + 8a$ $6a + 9b + 8a - 4b + 8a - 4b$

$= 6a + 9b + 6a + 9b + 8a - 4b + 8a - 4b$

$= 6a + 6a + 8a + 8a + 9b + 9b - 4b - 4b$

$= 12a + 16a + 18b - 8b$

$= 28a + 10b$

∴ Perimeter of the rectangle is $28a + 10b$.

9i.) $2a + b - a + b$

$= 2a - a + b - b$

$= a + b - b$

$= a$

ii.) $-2b + 2c - b + 3c$

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

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

$= -3b + -3b - c$

iii) $5a + b - (-6b) + 2a$

$= 5a + 2\ 5a - 2a + b + 6b$

$= 3a + 7b + 6b$

$= 3a + 7b$

iv) $a^3 - 1 + a - 3a - 2a^2$

$= a^3 - 1 + a - 3a - 2a^2$

$= a^3 - 1 + a^3 - (-2a^2) + a - 3a - 1$

$= a^3 + 2a^2 + 2a - 1$

v) $p + 2 - 1$

vi) $x + x + 2y - z - (-x) - y - 3z$

$= x + 2y - z + x + y - 3z$

$= x + x + 2y - y - z - 3z$

$= 2x + 2y - y - z - 3z$

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$= 2x + y - 4z$

vii) $3a^2 - 8ab - 2b^2 - 3a^2 - 4ab + 6b^2$

~~viii~~

$= 3a^2 - 3a^2 - 8ab - 4ab - 2b^2 + 6b^2$

$= -8ab - 4ab - 2b^2 + 6b^2$

$= -12ab - 2b^2 + 6b^2$

$= -12ab + 4b^2$