VIII H.W – 24th Feb (Algebraic Expressions & Identities)

1) The value of $6a^2b^2 - 4ab$, when $a = 2, b = -1$ is
(a) 0 (b) 16 (c) 32 (d) 12

2) The value of $145 \times 145 - 144 \times 144$ is
(a) 289 (b) 1 (c) 2 (d) 149.

3) If $x - \frac{1}{x} = 4$, then $x^2 + \frac{1}{x^2} =$ (a) 14 (b) 18 (c) 8 (d) −14

4) $\frac{(7.95)^2 - (2.05)^2}{7.95 - 2.05} =$ (a) 7.95 (b) 5 (c) 10 (d) 8

5) If $a + b = 7$ and $ab = 6$, then $a^2 + b^2 =$ (a) 27 (b) 13 (c) 37 (d) 47

6) $(-a^2b)(abc) =$ (a) $-a^3bc$ (b) $-a^2bc^2$ (c) $-a^3b^2c$ (d) a^3b^3c

7) If $8x = 45^2 - 43^2$, then x is equal to (a) 12 (b) $\frac{1}{4}$ (c) 11 (d) 22

8) The value of $1.71 \times 1.71 - 0.29 \times 0.29$ is equal to
(a) 2.1 (b) 2.84 (c) 3 (d) 1.5

9) If $x - y = 7$ and $xy = 9$, then $x^2 + y^2$ is equal to
(a) 67 (b) 54 (c) 58 (d) 31

10) The value of $16x^2 - 24xy + 9y^2$, where $x = \frac{1}{4}$ and $y = \frac{1}{3}$ is
(a) 0 (b) −2 (c) 4 (d) 1

11) The value of $\left(x + \frac{1}{x}\right)\left(x - \frac{1}{x}\right)$ is equal to
(a) $x^2 + x^{-2}$ (b) $x^2 - x^{-2}$ (c) $x^2 - \frac{2}{x^2}$ (d) $x^2 + \frac{1}{x^2} + 2$

12) If $x^2 + \frac{1}{x^2} = 23$, then $x + \frac{1}{x}$ is equal to
(a) 529 (b) $\sqrt{23}$ (c) $\sqrt{5}$ (d) 5

True or False ?

1) x^2y^2 is a monomial
2) $\frac{2x^2 - x}{x}$ is a polynomial
3) $(2m^2 - 3n^2)(3m^2 + 2n^2) = 6m^4 - 6n^4$.
4) The term of expression having no literal factor is called a constant term.
5) The symbol which takes various values is called a variable.
6) $ab(a - b) = a^2b - ab^2$

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7) The degree of polynomial $6x^3+7x^2y^2-6y^2+9$ is 3.

8) $\frac{a^4-b^4}{a-b} = (a+b)(a^2+b^2)$

Answer the following.

1. If $x^4+\frac{1}{x^4} = 6239$, find $x+\frac{1}{x}$
2. If $x^2+y^2 = 29$; $xy = 2$; find the value of $x-y$.
3. Subtract the sum of $3x-x^2+7$ and $-2x-3+5x^2$ from 7.
4. Simplify using identities: $\frac{196\times196-104\times104}{92}$
5. Prove that $(x-y)(x+y)+(y-z)(y+z)+(z-x)(z+x)=0$.
6. Evaluate : (i) 103^2-101^2
   (ii) 998^2-2^2
7. Find the product : (i) $-3x^2\times4a^2x^5\times3a^3x^4$
   (ii) $\frac{3}{5}xy\times\frac{5}{6}x^2y\times\frac{2}{5}xy^3$
8. If $3x+2y=12$ and $xy=6$, find the value of $9x^2+4y^2$
9. Find the value of x if $15x = 50^2-40^2$
10. Simplify $(5x+3)(x-1)(2x-3)$
11. What will be the product, if we multiply double of $x-\frac{2}{x}$ by the triple of $x+\frac{2}{x}$?
12. What must be added to the sum of x^2-4x+7 and $2x^2+5x-9$ to get 0
13. If $x+\frac{1}{x} = \sqrt{5}$, find $x^4+\frac{1}{x^4}$

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VIII. **Hw – 24th Feb** (Algebraic Expressions and Identities – Answers)

1) $6a^2b^2 - 4ab = 6(2)^2(-1)^2 - 4(2)(-1)$
$= 6 \times 4 \times 1 + 4 \times 2 = 24 + 8 = 32$ (c)

2) $145^2 - 144^2$ $\quad [a^2 - b^2 = (a+b)(a-b)]$
$= (145+144)(145-144) = 289 \times 1 = 289$ (a)

3) $\left(x - \frac{1}{x}\right)^2 = 4^2$

$x^2 + \frac{1}{x^2} - 2 = 16$

$\therefore x^2 + \frac{1}{x^2} = 16 + 2 = 18$ (b)

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

$\frac{(7.95+2.05)(7.95-2.05)}{7.95-2.05} = 7.95 + 2.05 = 10$ (c)

5) $a + b = 7$
$(a+b)^2 = 7^2$
$a^2 + b^2 + 2ab = 49$
$a^2 + b^2 + 2 \times 6 = 49$

$\therefore a^2 + b^2 = 49 - 12 = 37$ (c)

6) $-a^3b^2c$ (c)

7) $a^2 - b^2 = (a+b)(a-b)$
$8x = (45+43)(45-43)$
$8x = 88 \times 2$
$\therefore x = \frac{88 \times 2}{8_1} = 22$ (d)

8) $1.71^2 - 0.29^2$ $\quad [a^2 - b^2 = (a+b)(a-b)]$
$= (1.71+0.29)(1.71-0.29)$
$= 2 \times 1.42 = 2.84$ (b)

9) $x - y = 7$
$(x-y)^2 = 7^2$
$x^2 + y^2 - 2xy = 49$
$x^2 + y^2 - 2 \times 9 = 49$

$\therefore x^2 + y^2 = 49 + 18 = \underline{67}$ (a)

10) $16x^2 - 24xy + 9y^2 = (4x - 3y)^2 = \left(4 \times \frac{1}{4_1} - 3 \times \frac{1}{3_1}\right)^2 = (1-1)^2 = 0$ (a)

11) $\left(x + \frac{1}{x}\right)\left(x - \frac{1}{x}\right) = x^2 - \frac{1}{x^2} = x^2 - x^{-2}$ (b)

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12) $\left(x+\frac{1}{x}\right)^2 = x^2+\frac{1}{x^2}+2 = 23+2 = 25$

$\therefore x+\frac{1}{x} = \sqrt{25} = 5$ (d)

True or False

1) True

2) $\frac{2x^2-x}{x} = \frac{2x^{2-1}}{x_1} - \frac{x^1}{x_1} = 2x-1$, True

3) $(2m^2-3n^2)(3m^2+2n^2) = 6m^4+4m^2n^2-9m^2n^2-6n^4$
$= 6m^4-5m^2n^2-6n^4$ False

4) True

5) True

6) $ab(a-b) = a^2b-ab^2$ True

7) $6x^3+7x^2y^2-6y^2+9$
(3) (4) (2) (0)

degree = 4 False

8) $\frac{a^4-b^4}{a-b} = \frac{(a^2+b^2)(a^2-b^2)}{a-b} = \frac{(a^2+b^2)(a+b)(a-b)^1}{a-b_1}$, True

Answer the following :-

1) $\left(x+\frac{1}{x}\right)^2 = x^2+\frac{1}{x^2}+2 \longrightarrow (1)$

$\left(x^2+\frac{1}{x^2}\right)^2 = x^4+\frac{1}{x^4}+2 = 6239+2 = 6241$

$\therefore x^2+\frac{1}{x^2} = \sqrt{6241} = 79$

From eq: (1), $\left(x+\frac{1}{x}\right)^2 = 79+2 = 81$

$\therefore x+\frac{1}{x} = \sqrt{81} = \underline{\underline{9}}$

2) $(x-y)^2 = x^2+y^2-2xy = 29-2\times2 = 29-4 = 25$

$\therefore (x-y) = \sqrt{25} = \underline{\underline{5}}$

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

$\therefore 7 - (4x^2 + x + 4) = 7 - 4x^2 - x - 4 = \underline{\underline{-4x^2 - x + 3}}$

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

$\frac{196^2 - 104^2}{92} = \frac{(196+104)(196-104)}{92} = \frac{300 \times 92}{92} = \underline{\underline{300}}$

5) LHS, $(x^2 - y^2) + (y^2 - z^2) + (z^2 - x^2)$ $[\because (a+b)(a-b) = a^2 - b^2]$

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

$= 0$, RHS

6) (i) $a^2 - b^2 = (a+b)(a-b)$

$103^2 - 101^2 = (103 + 101)(103 - 101) = 204 \times 2 = \underline{\underline{408}}$

(ii) $998^2 - 2^2 = (998+2)(998-2) = 1000 \times 996 = \underline{\underline{996000}}$

7) (i) $-36 a^5 x^{11}$

(ii) $\frac{3}{5_1} xy \times \frac{5}{6_{2_1}} x^2 y \times \frac{2}{5} xy^3 = \frac{1}{5} x^4 y^5$

8) $(3x + 2y)^2 = (12)^2$

$9x^2 + 4y^2 + 12xy = 144$

$9x^2 + 4y^2 = 144 - 12 \times 6 = 144 - 72 = \underline{\underline{72}}$

9) $15x = (50+40)(50-40)$ $[a^2 - b^2 = (a+b)(a-b)]$

$15x = 90 \times 10 = 900$

$\therefore x = \frac{900}{15} = \underline{\underline{60}}$

10) $(5x+3)(x-1)(2x-3)$

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

$= (5x+3)(2x^2 - 5x + 3) = 10x^3 - 25x^2 + 15x + 6x^2 - 15x + 9$

$= \underline{\underline{10x^3 - 19x^2 + 9}}$

11) $2\left(x - \frac{2}{x}\right) \times 3\left(x + \frac{2}{x}\right) = 6\left(x^2 - \frac{4}{x^2}\right)$ $[(a+b)(a-b) = a^2 - b^2]$

12) Sum $= x^2 - 4x + 7 + 2x^2 + 5x - 9 = 3x^2 + x - 2$

The required number to be added $= 0 - 3x^2 - x + 2$

$= \underline{\underline{-3x^2 - x + 2}}$

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13) $\left(x+\frac{1}{x}\right)^2 = \left(\sqrt{5}\right)^2$

$$x^2+\frac{1}{x^2}+2 = 5$$

$$x^2+\frac{1}{x^2} = 3$$

$$\left(x^2+\frac{1}{x^2}\right)^2 = 3^2 = 9$$

$$x^4+\frac{1}{x^4}+2 = 9$$

$$\therefore x^4+\frac{1}{x^4} = 9-2 = 7$$

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