EDUFEST ACADEMY, BAVDHAN, PUNE

ICSE GRADE 9 MATHEMATICS — REVISION WORKSHEET

Chapters: 6 (Expansions) · 7 (Factorisation) · 9 (Indices)

SECTION A — EXPANSIONS (

1. Expand and simplify:

$$(3x - 2y)^2 + (x + y)^2$$

2. Expand:

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

3. Expand:

$$(x + 1/x)^3$$

4. If $x + 1/x = 5$, find the value of:
   (i) $x^2 + 1/x^2$ (ii) $x^3 + 1/x^3$ (iii) $x^4 + 1/x^4$

5. If $a - b = 4$ and $ab = 21$, find the values of $a^2 + b^2$ and $a^3 - b^3$.

6. If $a + b + c = 12$ and $a^2 + b^2 + c^2 = 64$, find the value of $ab + bc + ca$.

7. Using suitable identities, evaluate:
   (i) 105×96 (ii) $(998)^2$

8. Prove that: *[HOTS]*

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

9. If $2x + 3y = 13$ and $xy = 6$, find the value of $8x^3 + 27y^3$. *[HOTS]*

10. If $x = 3 + 2\sqrt{2}$, find the value of $x^2 + 1/x^2$. *[HOTS]*

SECTION B — FACTORISATION (Chapter 7)

1. Factorise: $6x^2 - 7x - 5$

2. Factorise using an identity: $49a^2 - 36b^2$

3. Factorise by regrouping: $ax + ay - bx - by$

4. Factorise completely: $x^3 + 3x^2 - 4x - 12$

5. Factorise completely: $a^4 - 5a^2 + 4$

6. Factorise: $x^2 - y^2 - 4xz + 4z^2$

7. Factorise: $x^4 + x^2y^2 + y^4$ *[HOTS]*

8. Factorise: $2x^2 + 5\sqrt{3}\,x + 6$ *[HOTS]*

9. Factorise: $8x^3 - 27y^3 + 1 + 18xy$ *[HOTS]*

10. Factorise completely: $(x^2 - 3x)^2 - 8(x^2 - 3x) - 20$ *[HOTS]*

SECTION C — INDICES (Chapter 9)

1. Simplify and express the answer with positive indices: $a^{-3} \cdot a^5 \cdot a^{-2}$

2. Express in exponential form: $81 \times \sqrt[3]{64}$

3. Evaluate: $(16/81)^{-3/4}$

4. Simplify: $(2^3 \cdot 8^{-1})^2$

5. Simplify: $\sqrt[3]{(64\, a^6\, b^{-3})}$

6. Solve for x: $2^{x+3} + 2^{x+1} = 320$ *[HOTS]*

7. Solve for x: $3^{2x-1} = 27^{x-3}$

8. If $5^{x-3} \times 3^{2x-8} = 225$, find the value of x. *[HOTS]*

9. Simplify:

$$(x^{a-b})^{a+b} \cdot (x^{b-c})^{b+c} \cdot (x^{c-a})^{c+a}$$

10. Evaluate: *[HOTS]*

$$(0.6)^0 - (0.1)^{-1} \div [\, (3/8)^{-1} \times (3/2)^3 + (-1/3)^{-1} \,]$$

SECTION D — MIXED PRACTICE

Board-pattern questions combining all three chapters

1. If $x^2 + 1/x^2 = 34$, find the value of $x + 1/x$ and hence the value of $x^3 + 1/x^3$. (Take the positive value.)

2. Factorise completely: $x^6 - y^6$

3. If $a + b + c = 0$, prove that $a^3 + b^3 + c^3 = 3abc$. Hence evaluate $(-28)^3 + (15)^3 + (13)^3$. *[HOTS]*

4. Evaluate: $(81)^{3/4} - (1/32)^{-2/5} + 8^{2/3} \times (1/2)^{-1} \times 3^0$

5. The area of a rectangle is $(6x^2 - 7x - 5)$ square units and its length is $(3x - 5)$ units. Find its breadth in terms of x, and hence find the perimeter of the rectangle when $x = 4$.

***** END OF WORKSHEET *****