Practice Worksheet on Algebra

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Long Answer Questions

1. Expand the following expressions as polynomials: 1) $(x + 5)^2$; 2) $(3y - 2)^2$

2. Factorize the following expressions: 1) $m^2 - 16$; 2) $49x^2 - 25y^2$

3. Factor the following expressions: 1) $a^3 + 8$; 2) $27b^3 - 1$

4. Prove the identity $(2x + 3)(2x - 3) - 4x^2 = -9$

5. Expand the expression $(7p + 4q)^2$ and simplify.

6. Factor the following expressions completely: 1) $9a^2 - 4b^2$; 2) $16x^{⊠} - 81y^{⊠}$

7. Factorize the following: 1) $x^2 + 6x + 9$; 2) $4y^2 - 12y + 9$

8. Expand and simplify the expression: $(2m - 3n)^2 - 4m^2 + 12mn$.

Multiple Choice Questions

1. What is the expansion of $(x + y)(x + y)$?

a) $(x + y)^2$
b) $(x - y)^2$
c) $x^2 - y^2$
d) $x^2 + y^2$

2. What is the expansion of $(x - y)^2$?

a) $x^2 + 2xy + y^2$
b) $x^2 - 2xy + y^2$
c) $x^2 - y^2$
d) $x^2 + y^2$

3. Which expression is equal to $x^2 - 25$?

a) $(x + 5)(x - 5)$
b) $(x + 5)^2$
c) $(x - 5)^2$
d) $x^2 - 25x + 25$

4. What is the factorization of $a^3 + b^3$?

a) $(a + b)(a^2 + ab + b^2)$
b) $(a + b)(a^2 - ab + b^2)$
c) $(a - b)(a^2 + ab + b^2)$
d) $(a - b)(a^2 - ab + b^2)$

5. Simplify: $(5a + 1)(5a - 1) - 25a^2$

a) 25
b) 1
c) 0
d) 10

6. What is the factorization of $x^2 - 10x + 25$?

a) $x^2 - 10x + 25$
b) $(x - 5)^2$
c) $(x + 5)^2$
d) $x^2 + 10x + 25$

7. What is the factorization of $x^2 - y^2$?

a) $x^2 + y^2$
b) $x^2 - y^2$
c) $(x + y)(x - y)$
d) $(x + y)^2$

8. Expand $(a - 4)^2$

a) $a^2 + 4a - 16$
b) $a^2 - 8a + 16$
c) $a^2 + 8a + 16$
d) $(a + 4)^2$

Answer Key

Long Answer Questions - Expected Responses

1. Expand the following expressions as polynomials: 1) $(x + 5)^2$; 2) $(3y - 2)^2$

Expected Answer: Expand using $(a+b)^2 = a^2+2ab+b^2$ and $(a-b)^2 = a^2-2ab+b^2$

2. Factorize the following expressions: 1) $m^2 - 16$; 2) $49x^2 - 25y^2$

Expected Answer: Use the difference of squares formula: $a^2 - b^2 = (a + b)(a - b)$

3. Factor the following expressions: 1) $a^3 + 8$; 2) $27b^3 - 1$

Expected Answer: Apply the formulas for the sum and difference of cubes

4. Prove the identity $(2x + 3)(2x - 3) - 4x^2 = -9$

Expected Answer: Use the formula $(a+b)(a-b) = a^2-b^2$

5. Expand the expression $(7p + 4q)^2$ and simplify.

Expected Answer: Expand the expression using $(a+b)^2 = a^2+2ab+b^2$

6. Factor the following expressions completely: 1) $9a^2 - 4b^2$; 2) $16x^\square - 81y^\square$

Expected Answer: Factor using the difference of squares

7. Factorize the following: 1) $x^2 + 6x + 9$; 2) $4y^2 - 12y + 9$

Expected Answer: Use the perfect square trinomial formula $a^2-2ab+b^2=(a-b)^2$

8. Expand and simplify the expression: $(2m - 3n)^2 - 4m^2 + 12mn$.

Expected Answer: Expand using $(a-b)^2$ and simplify the expression

Multiple Choice Questions - Correct Answers

1. What is the expansion of $(x + y)(x + y)$?

Correct Answer: $(x + y)^2$

2. What is the expansion of $(x - y)^2$?

Correct Answer: $x^2 - 2xy + y^2$

3. Which expression is equal to $x^2 - 25$?

Correct Answer: $(x + 5)(x - 5)$

4. What is the factorization of $a^3 + b^3$?

Correct Answer: $(a + b)(a^2 - ab + b^2)$

5. Simplify: $(5a + 1)(5a - 1) - 25a^2$

Correct Answer: 1

6. What is the factorization of $x^2 - 10x + 25$?

Correct Answer: $(x - 5)^2$

7. What is the factorization of $x^2 - y^2$?

Correct Answer: $(x + y)(x - y)$

8. Expand $(a - 4)^2$

Correct Answer: $a^2 - 8a + 16$