**Operations of Polynomials**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class: \_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_

Solve the following polynomial problems by applying appropriate factoring techniques. Show all your work and simplify your answers where possible.

 **Open Ended Questions**

1. Factor the polynomial $6x^{2}+9x$.

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2. Factor the polynomial $x^{2}+5x+6$.

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3. Factor the polynomial $4x^{2}−9$.

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4. Factor by grouping: $x^{3}+3x^{2}+2x+6$.

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5. Factor the polynomial $2x^{2}+7x+3$.

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6. Solve the equation by factoring: $x^{2}−4x−12=0$.

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 **Multiple Choice Questions**

1. Factor the polynomial: $x^{2}+5x+6$

a) $(x+1)(x+6)$

b) $(x+2)(x+3)$

c) $(x+2)(x+4)$

d) $(x+1)(x+5)$

2. Factor the polynomial: $2x^{2}+4x$

a) $2x(x+2)$

b) $2(x+2)$

c) $2x(x+4)$

d) $x(x+2)$

3. Factor the polynomial: $x^{2}−9$

a) $(x−3)(x+3)$

b) $(x−9)(x+9)$

c) $(x−1)(x+9)$

d) $(x−3)(x+9)$

4. Factor the polynomial: $3x^{2}+12x+12$

a) $3(x+4)^{2}$

b) $3(x+3)^{2}$

c) $3(x+2)^{2}$

d) $3(x+1)^{2}$

5. Factor the polynomial: $x^{2}−4x+4$

a) $(x−4)^{2}$

b) $(x−2)^{2}$

c) $(x−1)^{2}$

d) $(x−3)^{2}$

6. Factor the polynomial: $4x^{2}−25$

a) $(2x−5)(2x+5)$

b) $(4x−5)(4x+5)$

c) $(2x−25)(2x+25)$

d) $(4x−25)(4x+25)$

**Operations of Polynomials - Answers**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class: \_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_

Solve the following polynomial problems by applying appropriate factoring techniques. Show all your work and simplify your answers where possible.

 **Open Ended Questions**

1. Factor the polynomial $6x^{2}+9x$.

*To factor the polynomial* $6x^{2}+9x$*, we first find the greatest common factor (GCF) of the terms. The GCF is* $3x$*. Therefore,* $6x^{2}+9x=3x(2x+3)$*.*

2. Factor the polynomial $x^{2}+5x+6$.

*To factor the polynomial* $x^{2}+5x+6$*, we look for two numbers that multiply to 6 and add to 5. These numbers are 2 and 3. Therefore,* $x^{2}+5x+6=(x+2)(x+3)$*.*

3. Factor the polynomial $4x^{2}−9$.

*The polynomial* $4x^{2}−9$ *is a difference of squares. We can write it as* $(2x)^{2}−3^{2}$*. Therefore,* $4x^{2}−9=(2x−3)(2x+3)$*.*

4. Factor by grouping: $x^{3}+3x^{2}+2x+6$.

*To factor by grouping, we group the terms:* $(x^{3}+3x^{2})+(2x+6)$*. Then, we factor out the GCF from each group:* $x^{2}(x+3)+2(x+3)$*. Now, we factor out the common binomial factor:* $(x^{2}+2)(x+3)$*.*

5. Factor the polynomial $2x^{2}+7x+3$.

*To factor the polynomial* $2x^{2}+7x+3$*, we look for two numbers that multiply to* $2⋅3=6$ *and add to 7. These numbers are 6 and 1. Therefore, we rewrite the middle term:* $2x^{2}+6x+x+3$*. Now, we factor by grouping:* $2x(x+3)+1(x+3)$*. Finally, we factor out the common binomial factor:* $(2x+1)(x+3)$*.*

6. Solve the equation by factoring: $x^{2}−4x−12=0$.

*To solve the equation* $x^{2}−4x−12=0$ *by factoring, we look for two numbers that multiply to -12 and add to -4. These numbers are -6 and 2. Therefore,* $x^{2}−4x−12=(x−6)(x+2)$*. Setting each factor equal to zero gives us the solutions:* $x−6=0$ *or* $x+2=0$*. Thus,* $x=6$ *or* $x=−2$*.*

 **Multiple Choice Questions**

1. Factor the polynomial: $x^{2}+5x+6$

a) $(x+1)(x+6)$

b) $(x+2)(x+3)$

c) $(x+2)(x+4)$

d) $(x+1)(x+5)$

2. Factor the polynomial: $2x^{2}+4x$

a) $2x(x+2)$

b) $2(x+2)$

c) $2x(x+4)$

d) $x(x+2)$

3. Factor the polynomial: $x^{2}−9$

a) $(x−3)(x+3)$

b) $(x−9)(x+9)$

c) $(x−1)(x+9)$

d) $(x−3)(x+9)$

4. Factor the polynomial: $3x^{2}+12x+12$

a) $3(x+4)^{2}$

b) $3(x+3)^{2}$

c) $3(x+2)^{2}$

d) $3(x+1)^{2}$

5. Factor the polynomial: $x^{2}−4x+4$

a) $(x−4)^{2}$

b) $(x−2)^{2}$

c) $(x−1)^{2}$

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6. Factor the polynomial: $4x^{2}−25$

a) $(2x−5)(2x+5)$

b) $(4x−5)(4x+5)$

c) $(2x−25)(2x+25)$

d) $(4x−25)(4x+25)$