

Addition and Subtraction: Simplify the following

1. $(6x^3 - 3x^2 - 7x) - (8x^3 - x) - (5x^3 + 2x^2)$

2. $(3x^3 + 7 - x) - (10x^3 - 4x) + (7x + 5)$

Multiplication: Find each product

3. $(2x + 3)^2$

4. $(2x - 1)(x + 3) + 3(x + 3)$

5. $(3x + 7)(7x^2 - 5x + 6)$

6. $(8 + 3x)(8 - 3x)$

Solve the following polynomials by factoring

7. $x^4 + 3x^3 - 18x^2 = 0$

8. $x^3 + 5x^2 - 2x - 10 = 0$

9. $8x^3 + 27 = 0$

Dividing Polynomials by Polynomials Using **Long Division**

10. $(x^2 - 11x + 28) \div (x - 4)$

11. $(x^3 - 27)(x - 3)^{-1}$

$$12. (3x^3 - 17x^2 + 15x - 25) \div (x - 5)$$

$$13. (3x^3 + 4x + 11) \div (x^2 - 3x + 2)$$

Use **synthetic division** to divide

$$14. (4x^3 - 9x + 8x^2 - 18) \div (x + 2)$$

$$15. (-x^3 + 75x - 250) \div (x + 10)$$

$$16. (10x^4 - 50x^3 - 800) \div (x - 6)$$

$$17. (x^4 - 4x^3 - 15x^2 + 58x - 40) \div (x - 5)$$

$$18. (x^4 - 2x^3 + x - 1) \div (x + 1)$$

$$19. (x^3 - 7x + 6) \div (x - 2)$$