Name:_____ Date:_____ Band:_____
Algebra 2

Operations with Polynomials & Factoring Polynomials Practice

Find the sum.

1. $(-5x^2 + 4x - 2) + (-8x^2 + 2x + 1)$ **2.** $(8x^4 + 2x^2 - 1) + (3x^3 - 5x^2 + 7x + 1)$

3. $(7x^6 + 2x^5 - 3x^2 + 9x) + (5x^5 + 8x^3 - 6x^2 + 2x - 5)$

Find the difference.

4. $(7x^4 - 9x^3 - 4x^2 + 5x + 6) - (2x^4 + 3x^2 - x^2 + x - 4)$

5. $(4x^5 - 7x^3 - 9x^2 + 18) - (14x^5 - 8x^4 + 11x^2 + x)$

6. $(11x^4 - 9x^2 + 3x + 11) - (2x^4 + 6x^3 + 2x - 9)$

Find the product.

7. $-4x^2(11x^3 + 2x^2 + 9x + 1)$ **8.** $(5x^2 - 4x + 6)(-2x + 3)$

9. $(3x^3 - 9x + 7)(x^2 - 2x + 1)$

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

11. $(4 - 5x)(1 - 2x)(3x + 2)$

12. $(2y - 5)(2y + 5)$

13. $(7h + 4)^2$

14. $(2t + 4)^3$

Divide using polynomial long division.

15. $(3x^2 - 14x - 5) \div (x - 5)$

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

17. $(5x^4 - 2x^3 - 7x^2 - 39) \div (x^2 + 2x - 4)$

18. $(7x^3 + x^2 + x) \div (x^2 + 1)$

Divide using synthetic division.

19. $(4x^2 - 13x - 5) \div (x - 2)$

20. $(x^3 - 4x + 6) \div (x + 3)$

21. $(3x^3 - 5x^2 - 2) \div (x - 1)$

22. $(x^4 + 4x^3 + 16x - 35) \div (x + 5)$

Factor the polynomial completely.

23. $x^3 - 2x^2 - 24x$

24. $3p^5 - 192p^3$

25. $2q^4 + 9q^3 - 18q^2$

26. $x^3 + 64$

27. $g^3 - 343$

28. $3h^9 - 192h^6$

29. $y^3 - 5y^2 + 6y - 30$

30. $3a^3 + 18a^2 + 8a + 48$

31. $2k^3 - 20k^2 + 5k - 50$

32. $49k^4 - 9$

33. $c^4 + 9c^2 + 20$

34. $3r^8 + 3r^5 - 60r^2$