1.2 Operations with Polynomials ***Name:***

In Exercises 1 –8 determine whether the given algebraic expression is a polynomial. If it is, list its leading coefficient, constant term, and degree.

1. $1+x^3$

2. -7

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

4. 7^x+2x+1

5. $(x+\sqrt{3})(x-\sqrt{3})$

6. $4x^2+3\sqrt{x}+5$

7. $\frac{7}{x^2}+\frac{5}{x}-15$

8. $(x-1)^k$, where k is a fixed positive integer

In Exercises 9 – 21 perform the indicated operations

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

10. $(m^2+3)-(4-3m)$

11. $(2x^2-4x+7)-(-2x^2+3x-7)$

12. $5a^4(a^2-4a+3)$

13. $(5x-6)(4x+3)$

14. $(x+2)(x^2-4x+5)$

15. $(x+3)^2$

16. $(7x-3)^2$

17. $(5-2x)^2$

18. $(3x+5)(2x+4)-(x-6)(4x-5)$

19. $(2x+5)(2x-5)-(2x+5)^2$

20, $(x+3)^2+(x-3)^2$

21. $(x-2)^2+(5-2x)(1+x)$

In Exercises 22 – 29, use synthetic division to find the quotient and remainder.

22. $(3x^4 - 8x^3 + 9x + 5) \div (x - 2)$

23. $(4x^3 - 3x^2 + x + 7) \div (x - 2)$

24. $(2x^4 + 5x^3 - 2x - 8) \div (x + 3)$

25. $(3x^3 - 2x^2 - 8) \div (x + 5)$

26. $(5x^4 - 3x^2 - 4x + 6) \div (x - 7)$

27. $(3x^4 - 2x^3 + 7x - 4) \div (x - 3)$

28. $(x^4 - 6x^3 + 4x^2 + 2x - 7) \div (x - 2)$

29. $(x^6 - x^5 + x^4 - x^3 + x^2 - x + 1) \div (x - 1)$

In Exercises 30 – 35, state the quotient and remainder when the first polynomial is divided by the second using long division. Check your division by calculating: (Divisor)(Quotient) + Remainder.

30. $3x^4 + 2x^2 - 6x + 1; \quad x + 1$

31. $x^5 - x^3 + x - 5; \quad x - 2$

32. $x^5 + 2x^4 - 6x^3 + x^2 - 5x + 1; \quad x^3 + 1$

33. $3x^4 - 3x^3 - 11x^2 + 6x - 1; \quad x^3 + x^2 - 2$

34. $5x^4 + 5x^2 + 5; \quad x^2 - x + 1$

35. $x^5 - 1; \quad x - 1$