

Answer all the questions pertaining to #1 & #2

1. $f(x) = 5 - 3x^3 + 2x^4 - 4x$ Standard Form: $2x^4 - 3x^3 - 4x + 5$ Leading Coefficient: <u>2</u> Constant: <u>5</u> Name by Degree: <u>Quartic</u> Name by # of Terms: <u>Polynomial</u>	2. $g(x) = 5x + 2x^2 - x^5 + 7$ Standard Form: $-x^5 + 2x^2 + 5x + 7$ Leading Coefficient: <u>-1</u> Constant: <u>7</u> Name by Degree: <u>Quintic</u> Name by # of Terms: <u>Polynomial</u>
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Add/Subtract/Multiply/Binomial Expansion

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

$2x - 7 + 3x^3 + x^3 - 2x^2 + 5x$

$4x^3 - 2x^2 + 7x - 7$

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

$4x^4 - 3x^2 + x - 5 - 2x^2 + 3x^4 + 3x - 1$

$7x^4 - 5x^2 + 4x - 6$

5. $(2x - 3)(x + 2)$

$2x^2 + 4x - 3x - 6$

$2x^2 + 1x - 6$

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

$3x^3 + 6x^2 - 9x - 1x^2 - 2x + 3$

$3x^3 + 5x^2 - 11x + 3$

7. $(a + b)(a^2 + 2ab - b^2)$

$a^3 + 2a^2b - ab^2 + a^2b + 2ab^2 - b^3$

$a^3 + 3a^2b + 1ab^2 - b^3$

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

$2x^8 - 6x^7 + 14x^5$

9. $(x + 4)^4$

$1x^4 \quad 4x^3(4) \quad 6x^2(4)^2 \quad 4x(4)^3 \quad 1(4)^4$

$1x^4 + 16x^3 + 96x^2 + 256x + 256$

10. $(2x - 3)^3$

$1(2x)^3 \quad 3(2x)^2(-3) \quad 3(2x)(-3)^2 \quad 1(-3)^3$

$8x^3 - 36x^2 + 54x - 27$

11. $(x - 3)^5$

$1x^5 \quad 5x^4(-3) \quad 10x^3(-3)^2 \quad 10x^2(-3)^3 \quad 5x(-3)^4 \quad 1(-3)^5$

$1x^5 - 15x^4 + 90x^3 - 270x^2 + 405x - 243$

12. $(x + y)^6$

$1x^6 + 6x^5y + 15x^4y^2 + 20x^3y^3 + 15x^2y^4 + 6xy^5 + 1y^6$

$1x^6 \quad 6x^5y \quad 15x^4y^2 \quad 20x^3y^3 \quad 15x^2y^4 \quad 6xy^5 \quad 1y^6$

Combine Functions

$$f(x) = x^2 - 3x + 4$$

$$g(x) = 2x + 1$$

$$h(x) = 3x^3 + 2x - 1$$

13. $g(x) - h(x)$

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

$$2x+1 - 3x^3 - 2x + 1$$

$$\boxed{-3x^3 + 2}$$

14. $3f(x) + 2g(x)$

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

$$3x^2 - 9x + 12 + 4x + 2$$

$$\boxed{3x^2 - 5x + 14}$$

15. $g(x) \cdot f(x)$

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

$$2x^3 - 6x^2 + 8x + 1x^2 - 3x + 4$$

$$\boxed{2x^3 - 5x^2 + 5x + 4}$$

16. $4g(3) + h(-2)$

$$4[2(3)+1] + [3(-2)^3 + 2(-2) - 1]$$

$$4(6+1) + (-24 - 4 - 1)$$

$$4(7) + -29 = 28 - 29 = \boxed{-1}$$

Divide Polynomials

17. $(2x^4 - 3x^2 + 2x + 5) \div (x+1) \quad x = -1$

$$\begin{array}{r} -1 \ 2 \ 0 \ -3 \ 2 \ 5 \\ \downarrow \ -2 \ 2 \ 1 \ -3 \\ \hline 2 \ -2 \ -1 \ 3 \ 2 \end{array}$$

$$\boxed{2x^3 - 2x^2 - 1x + 3 + \frac{2}{x+1}}$$

18. $(x^4 - x^3 + 2x^2 - 3x + 5) \div (x-2) \quad x = 2$

$$\begin{array}{r} 2 \ 1 \ -1 \ 2 \ -3 \ 5 \\ \downarrow \ 2 \ 2 \ 8 \ 10 \\ \hline 1 \ 1 \ 4 \ 5 \ 15 \end{array}$$

$$\boxed{x^3 + x^2 + 4x + 5 + \frac{15}{x-2}}$$

19. $(10x^3 + 27x^2 + 14x + 5) \div (x-2) \quad x = 2$

$$\begin{array}{r} 2 \ 10 \ 27 \ 14 \ 5 \\ \downarrow \ 20 \ 94 \ 216 \\ \hline 10 \ 47 \ 108 \ 221 \end{array}$$

$$\boxed{10x^2 + 47x + 108 + \frac{221}{x-2}}$$

20. $(2x^3 - 5x + 6) \div (x+2) \quad x = -2$

$$\begin{array}{r} -2 \ 2 \ 0 \ -5 \ 6 \\ \downarrow \ -4 \ 8 \ -6 \\ \hline 2 \ -4 \ 3 \ 0 \end{array}$$

$$\boxed{2x^2 - 4x + 3}$$

21. $(x^3 + 2x^2 - 6x - 9) \div (x-2) \quad x = 2$

$$\begin{array}{r} 2 \ 1 \ 2 \ -6 \ -9 \\ \downarrow \ 2 \ 8 \ 4 \\ \hline 1 \ 4 \ 2 \ -5 \end{array}$$

$$\boxed{x^2 + 4x + 2 - \frac{5}{x-2}}$$

22. $(2x^3 + 11x^2 + 18x + 9) \div (x+3) \quad x = -3$

$$\begin{array}{r} -3 \ 2 \ 11 \ 18 \ 9 \\ \downarrow \ -6 \ -15 \ -9 \\ \hline 2 \ 5 \ 3 \ 0 \end{array}$$

$$\boxed{2x^2 + 5x + 3}$$

23. $(4x^4 + 5x^3 + 2x^2 - 1) \div (x+1) \quad x = -1$

$$\begin{array}{r} -1 \ 4 \ 5 \ 2 \ 0 \ -1 \\ \downarrow \ -4 \ -1 \ -1 \ 1 \\ \hline 4 \ 1 \ 1 \ -1 \ 0 \end{array}$$

$$\boxed{4x^3 + x^2 + x - 1}$$

24. $(x^4 - 6x^3 - 40x + 33) \div (x-7) \quad x = 7$

$$\begin{array}{r} 7 \ 1 \ -6 \ 0 \ -40 \ 33 \\ \downarrow \ 7 \ -7 \ -49 \ -633 \\ \hline 1 \ -1 \ -7 \ -89 \ -960 \end{array}$$

$$\boxed{x^3 + x^2 + 7x + 9 + \frac{96}{x-7}}$$