ALGEBRA 2 HONORS
PROBLEM SET #19

DUE DATE: NOVEMBER 28, 2023

Question 1. Let $P(x) = 5x^4 - 3x^3 + 2x + 6 - 14x^2$ and $Q(x) = 2x^3 - 20 + 3x$.

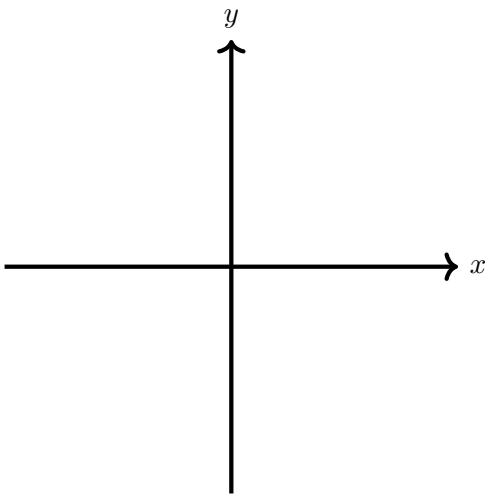
(a) Find $P(x) + Q(x)$.
(b) Find $P(x) - Q(x)$.

Question 2. Let $f(x) = 7x + 3x^2 + \frac{5}{2}$ and $g(x) = 3x^2 + 7x - \frac{5}{2}$

(a) Find $f(x) + g(x)$
(b) Find $f(x) - g(x)$
(c) Find $3f(x)$ and $2g(x)$.
(d) Find $3f(x) - 2g(x)$.
(e) What is the degree of $3f(x) - 2g(x)$?
(f) Find $f(x) \cdot g(x)$.
(g) What is the degree of $f(x) \cdot g(x)$?

Question 3. Let $f(x) = -3x^2(x+3)(x-5)^2(x-7)^{2023}$

(a) Find the x-intercepts of $f(x)$, with multiplicity:
(b) Find the degree of $f(x)$ by adding the multiplicities
(c) Sketch a graph of $f(x)$



Question 4. (a) What does the Fundamental Theorem of Algebra say?
(b) If $f(x) = x^2 + 4$, how many zeros (roots or x-intercepts) are there if we allow *complex* numbers?

(c) If $g(x) = 7x^{2023} - 5$, how many zeros (roots or x-intercepts) are there if we allow *complex* numbers?

(d) How many times will f and g intersect each other in the conplex plane?