

**This section to be completed without a graphing calculator.**

Do the required work to decide if the following are polynomials in one variable. If they are polynomials, fill in the information provided. If it is not a polynomial, **explain why**.

1.  $4.5 - 7x^3 + 2x^5 + 9.4x$

Circle one:    Monomial    Binomial    Trinomial    Polynomial    Not Polynomial

Descending order:

Degree

Leading Coefficient:

2.  $-8x^3(5x^4 - 4x^5)$

Circle one:    Monomial    Binomial    Trinomial    Polynomial    Not Polynomial

Descending order:

Degree

Leading Coefficient:

3.  $5x + \frac{4}{x^3} - 9x^2$

Circle one:    Monomial    Binomial    Trinomial    Polynomial    Not Polynomial

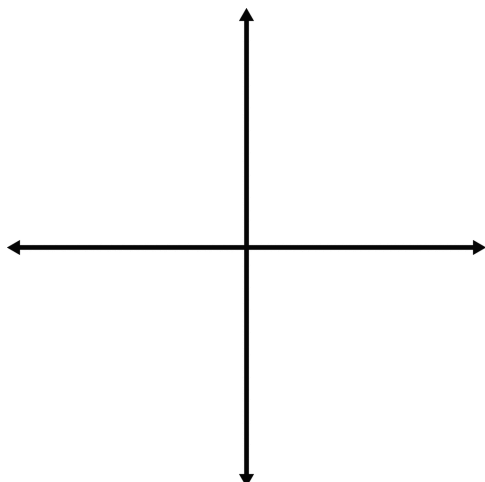
Descending order:

Degree

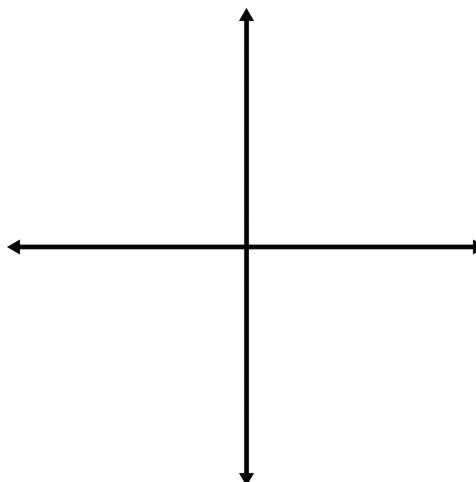
Leading Coefficient:

Sketch the following, if possible.

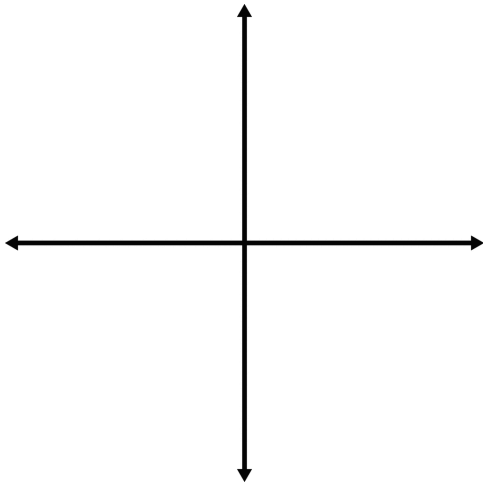
4. Degree of 9, 5 real zeros,  
negative leading coefficient



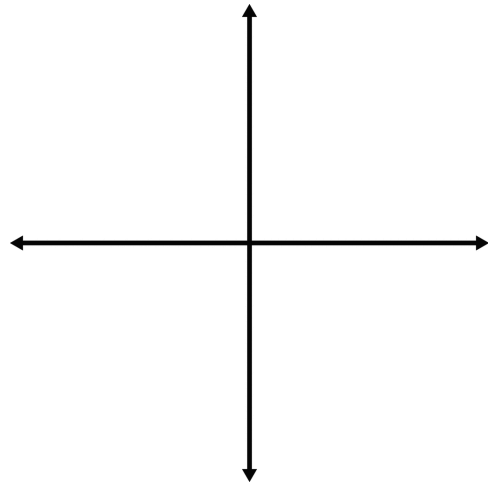
5. Degree of 9, 4 real zeros,  
positive leading coefficient



6. Degree of 8, 4 real zeros, positive leading coefficient



7. Degree of 8, 6 real zeros, negative leading coefficient



8. Without using a calculator, just looking at the equation  $y = 14x^{18} - 7x^{15} + 2x^5 - 93$ , answer the following:

a. What are the total number of solutions?

b. What is the leading coefficient?

c. What are the end behaviors?

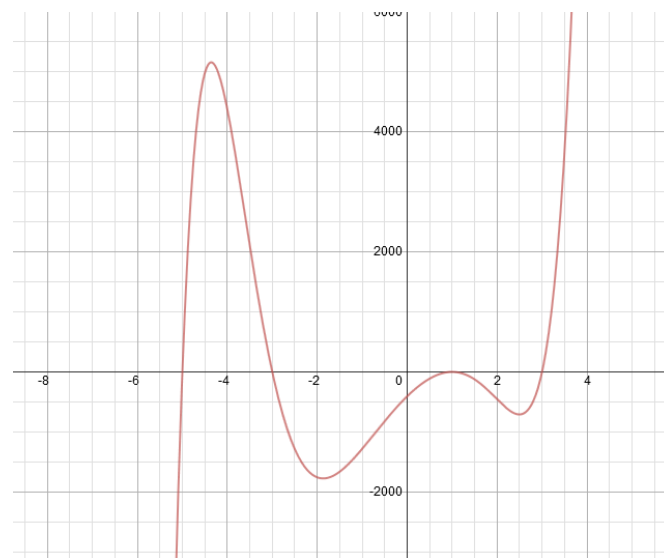
d. If I told you that this graph crossed the x-axis 10 times, how many imaginary zeroes will it have?

9. Give the sketch to the right, answer the following:

a. # of total roots:

b. # of real roots:

c. # of imaginary roots:



Divide, using the method of your choice.

10.  $\frac{x^3 + x^2 - 10x + 13}{x - 2}$

11.  $(2x^3 + 5x^2 - 2x - 15) \div (2x - 3)$

12.  $(-2x^2 + 35) \div (x - 4)$

13.  $\frac{2x^4 - x^3 + x^2 + x - 3}{x^2 - 1}$

14.  $\frac{x^4 - 3x^3 + 5x - 6}{x + 2}$

15. Is  $(x - 1)$  a factor of  $x^3 - 3x^2 - 7x + 9$ ?

Use the given factor and your algebra skills to find all the roots of the polynomial. Give exact answers; no decimals.

16.  $f(x) = x^3 - 6x^2 + 14x - 15; (x - 3)$

17.  $g(x) = x^4 - 2x^3 + x^2 - 4; (x + 1), (x - 2)$

18. Write a polynomial function with zeros at -3, 1, and 7 that goes through (0,42).

**This section can be completed with a graphing calculator.**

19. Given the equation  $y = 0.02x^5 + 0.004x^4 - 1.3x^3 - 0.3x^2 + 10x + 25$ , find the following: Round to the hundredths.

a. Find the real roots:

b. Find the relative maximum(s):

c. Find the relative minimum(s):

Use a graphing calculator to find real root(s), then use your algebra skills to find all the roots. Give exact answers; no decimals.

20.  $f(x) = x^3 - 10x^2 + 18x - 4$

21.  $g(x) = x^4 - 7x^3 + 13x^2 + x - 20$