

**Graphing.**

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

- Domain:
- local max:
- local min:
- increasing:
- decreasing:
- zeros:
- left end behavior:
- right end behavior:

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

- Domain:
- local max:
- local min:
- increasing:
- decreasing:
- zeros:
- left end behavior:
- right end behavior:

**Multiply.**

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

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

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

**Factor.**

6.  $3x^3 + 24$

7.  $81x^4 - 16$

8.  $x^3 + 8x^2 + 15x$

9.  $x^6 - 64$

**Division.**

10.  $(2x^3 - 7x^2 - 17x + 6) \div (2x + 3)$

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

12.  $(x^3 - 9x + 1) \div (x - 3)$



**Find all the zeros.**

13.  $f(x) = x^3 - 18x^2 - x + 18$

14.  $g(x) = x^3 - x^2 + 15x + 17$

15.  $f(x) = x^4 + 5x^3 + 14x^2 - 5x - 15$

16.  $h(x) = -3x^3 + 21x^2 - 9x - 30$

**Extra.**17. Draw the graph of a 4<sup>th</sup> degree polynomial with 4 real zeros (2 positive and 2 negative).18. Draw the graph of a 3<sup>rd</sup> degree polynomial with 1 real zero and 2 imaginary zeros.19. Is 5 a zero of  $f(x) = x^3 + 6x^2 - x - 30$ ?

20. If 7 is a zero of a polynomial, then what is the factor?

21. Is  $(x + 3)$  a factor of  $f(x) = x^3 + 5x^2 - 2x - 24$ ?