

Write each polynomial in standard form, identify the leading coefficient, and classify it by degree and amount of terms.

1)  $-8x^4 - 9x^2 - 5$

**Standard Form:** decreasing exponents  
 $-8x^4 - 9x^2 - 5$

**Name:** degree 4, 3 terms  
**Quartic trinomial**

**Leading Coefficient:** first # in standard form  
 $-8$

2)  $-2x^2 + 8x^5 - 5x^2$

**Standard Form:** combine like terms  
 $8x^5 - 7x^2$

**Name:** degree 5, 2 terms  
**Quintic binomial**

**Leading Coefficient:**  
 $8$

Sketch the graph of each function and give the listed information. Round to the nearest thousandth, if necessary.

Use <https://www.desmos.com/calculator>

3)  $f(x) = -x^3 + 4x^2 - 7$

• **Zeros:** x-intercepts  
 $(-1.164, 0)$ ,  $(1.773, 0)$ ,  $(3.391, 0)$

• **End Behavior:** how does it look at the ends

As  $x \rightarrow \infty$ ,  $y \rightarrow -\infty$  (right, down)

As  $x \rightarrow -\infty$ ,  $y \rightarrow \infty$  (left, up)

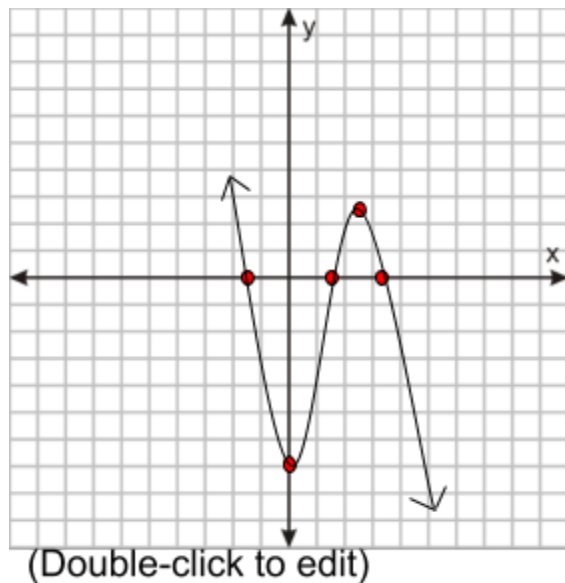
• **Relative Maximum(s):** high point  
 $(2.667, 2.481)$

• **Relative Minimum(s):** low point  
 $(0, -7)$

• **Intervals:**

Increasing: between min and max  
 $0 < x < 2.667$

Decreasing: left of min and right of max  
 $x < 0$ ,  $x > 2.667$



Use <https://www.desmos.com/calculator>

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

• Zeros: x-intercepts

**(1.853,0), (3.435,0)**

• End Behavior: how does it look at the ends

As  $x \rightarrow \infty$ ,  $y \rightarrow \infty$  (right, up)

As  $x \rightarrow -\infty$ ,  $y \rightarrow \infty$  (left, up)

• Relative Maximum(s): high point

**(1,3)**

• Relative Minimum(s): low point

**(-0.088,0.954), (2.383,-5.31)**

• Intervals:

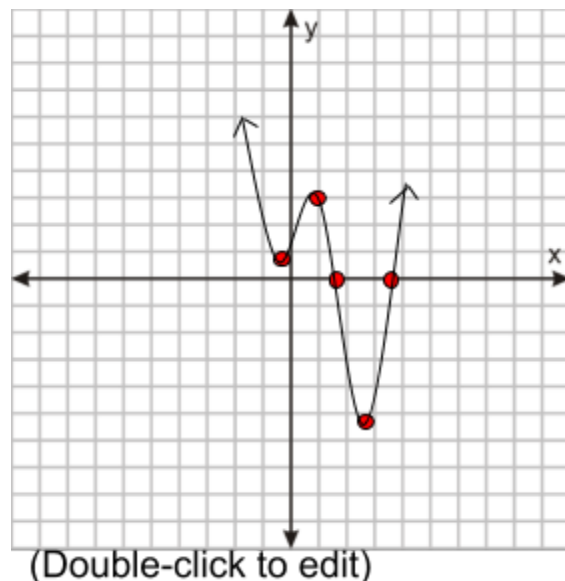
Increasing:

between min1 and max, right of min2

**$-0.088 < x < 1$ ,  $x > 2.838$**

Decreasing: left of min 1, between max and min2

**$x < -0.088$ ,  $1 < x < 2.838$**



Write a polynomial function that has the given zeros and multiplicities:

5) 1, 4, 3 (multiplicity 2)

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

$$f(x) = (x - 1)(x - 4)(x - 3)(x - 3)$$

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

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

$$f(x) = (x^3 - 5x^2 + 4x - 3x^2 + 15x - 12)(x - 3)$$

$$f(x) = (x^3 - 8x^2 + 19x - 12)(x - 3)$$

$$f(x) = x^4 - 8x^3 + 19x^2 - 12x - 3x^3 + 24x^2 - 57x + 36$$

$$f(x) = x^4 - 11x^3 + 43x^2 - 69x + 36$$