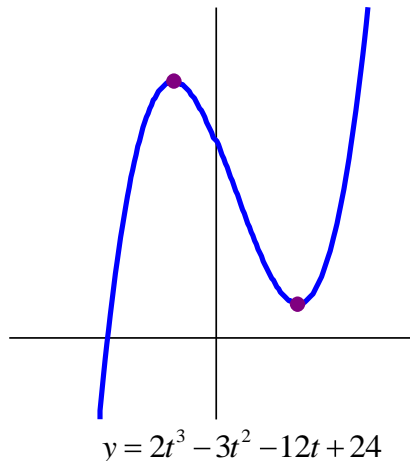
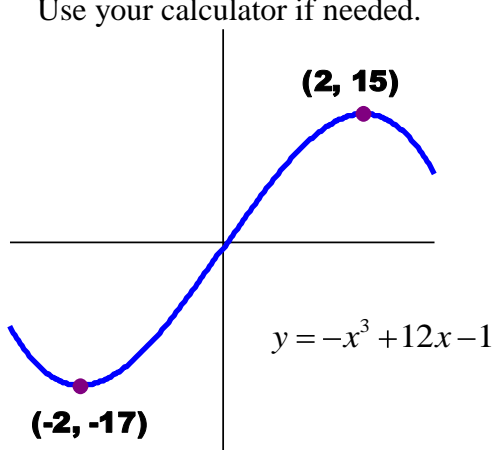


A function P is a **polynomial** if it can be written

$$P(x) = a_n x^n + a_{n-1} x^{n-1} + \dots + a_2 x^2 + a_1 x + a_0, \text{ where } n \text{ is a nonnegative integer.}$$

The domain of P is $-\infty, \infty$. The largest exponent n is the **degree** of the polynomial.

1. Determine the intervals on which the following polynomials are increasing or decreasing. Use your calculator if needed.



2. The 2010 Consumer Expenditure Survey from the Bureau of Labor Statistics comprised 121,107 households and found that annual food expenditures per household were \$6,129. If the typical household contained 2.5 persons, what was the average yearly expenditure per person?
3. Suppose the cost for a company to produce x toys during one day is $C(x) = 0.2x^2 + 6x + 850$ dollars.
- What does it cost for the company to produce 100 toys during one day?
 - What is the average cost per toy if the company produces 100 toys in one day?
 - What is the average cost per toy when x toys are produced in one day? This will be a formula; name it $a(x)$.
 - Use your calculator to graph your function $a(x)$ in the window $0, 200 \times 0, 80$. Sketch the graph by hand, labeling the axes with correct variables and units. Find and interpret the minimum value of $a(x)$.