## Practice
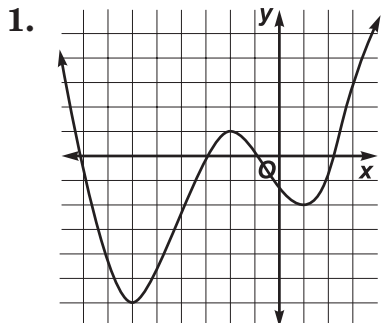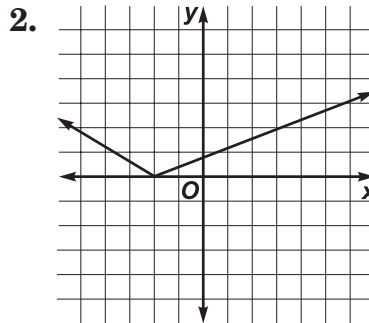
# Critical Points and Extrema
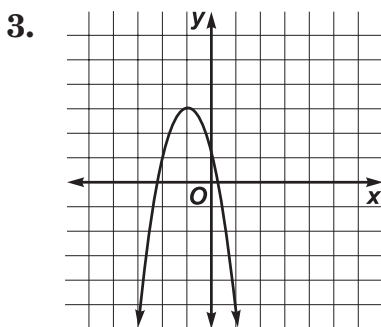
*Locate the extrema for the graph of y = f(x). Name and classify the extrema of the function.*

**1.**



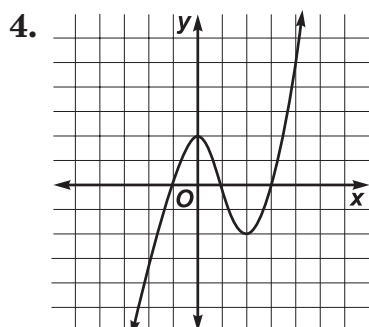**relative maximum: (−2, 1)**
**relative minimum: (1, −2)**
**absolute minimum: (−6, −6)**

**2.**



**absolute minimum: (−2, 0)**

**3.**



**absolute maximum: (−1, 3)**

**4.**



**relative maximum: (0, 2)**
**relative minimum: (2, −2)**

*Determine whether the given critical point is the location of a maximum, a minimum, or a point of inflection.*

**5.** $y = x^2 - 6x + 1, x = 3$
**minimum**

**6.** $y = x^2 - 2x - 6, x = 1$
**minimum**

**7.** $y = x^4 + 3x^2 - 5, x = 0$
**minimum**

**8.** $y = x^5 - 2x^3 - 2x^2, x = 0$
**maximum**

**9.** $y = x^3 + x^2 - x, x = -1$
**maximum**

**10.** $y = 2x^3 + 4, x = 0$
**point of inflection**

**11.** *Physics*  Suppose that during an experiment you launch a toy rocket straight upward from a height of 6 inches with an initial velocity of 32 feet per second. The height at any time $t$ can be modeled by the function $s(t) = -16t^2 + 32t + 0.5$ where $s(t)$ is measured in feet and $t$ is measured in seconds. Graph the function to find the maximum height obtained by the rocket before it begins to fall.
**16.5 ft**

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