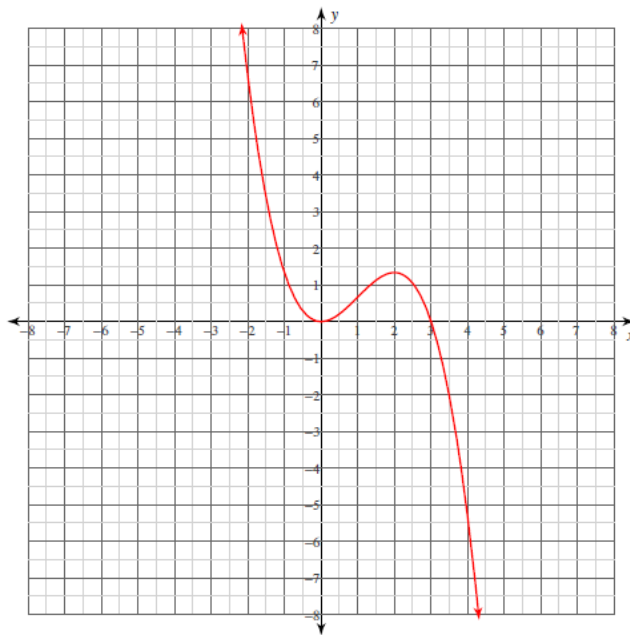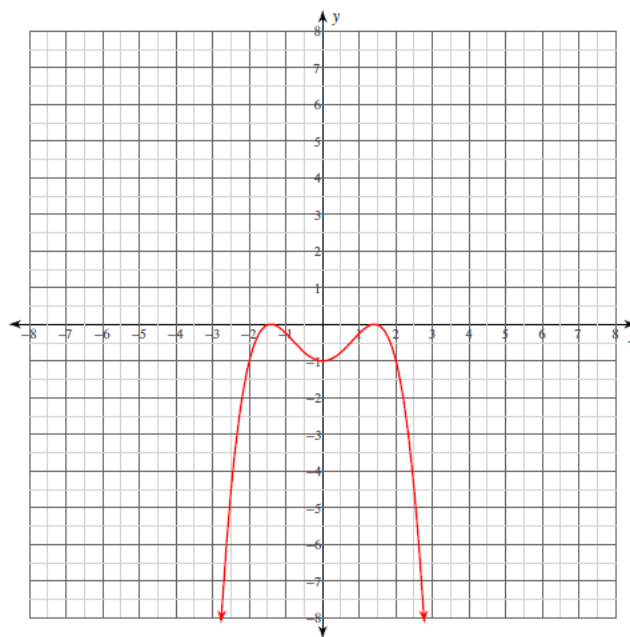1) $y = -\dfrac{x^3}{3} + x^2$

x-intercepts at $x = 0,\ 3$
y-intercept at $y = 0$
Critical points at: $x = 0,\ 2$
Increasing: $(0,\ 2)$
Decreasing: $(-\infty,\ 0),\ (2,\ \infty)$
Inflection point at: $x = 1$
Concave up: $(-\infty,\ 1)$
Concave down: $(1,\ \infty)$
Relative minimum: $(0,\ 0)$
Relative maximum: $\left(2,\ \dfrac{4}{3}\right)$

2) $y = -\dfrac{x^4}{4} + x^2 - 1$

x-intercepts at $x = -\sqrt{2},\ \sqrt{2}$
y-intercept at $y = -1$
Critical points at: $x = -\sqrt{2},\ 0,\ \sqrt{2}$
Increasing: $\left(-\infty,\ -\sqrt{2}\right),\ \left(0,\ \sqrt{2}\right)$
Decreasing: $\left(-\sqrt{2},\ 0\right),\ \left(\sqrt{2},\ \infty\right)$
Inflection points at: $x = -\dfrac{\sqrt{6}}{3},\ \dfrac{\sqrt{6}}{3}$
Concave up: $\left(-\dfrac{\sqrt{6}}{3},\ \dfrac{\sqrt{6}}{3}\right)$
Concave down: $\left(-\infty,\ -\dfrac{\sqrt{6}}{3}\right),\ \left(\dfrac{\sqrt{6}}{3},\ \infty\right)$
Relative minimum: $(0,\ -1)$
Relative maxima: $\left(-\sqrt{2},\ 0\right),\ \left(\sqrt{2},\ 0\right)$

No Key for # 3, but you can check your work by graphing the function.