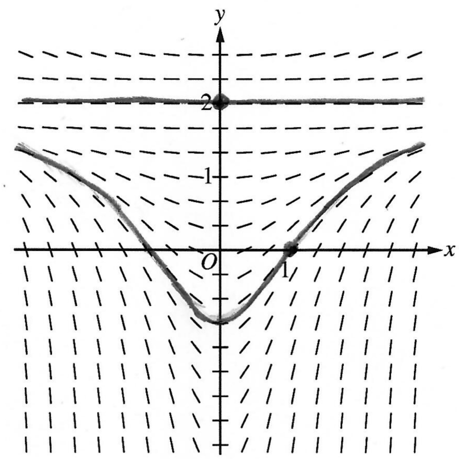
2018 AB #6
(no calculator)

(a)



(b)

$$m\Big|_{(1,0)} = \frac{dy}{dx}\Big|_{(1,0)} = \frac{1}{3}(1)\left(0-2\right)^2 = \frac{4}{3}$$

So an equation for the tangent line at (1,0) is $\boxed{y-0=\frac{4}{3}\left(x-1\right)}$

Using this equation: $f(0.7)-0 \approx \frac{4}{3}\left(0.7-1\right) \Rightarrow f(0.7) \approx \boxed{\frac{4}{3}\left(0.7-1\right)}$ or -0.4

(c)

$$\frac{dy}{dx} = \frac{1}{3}x\left(y-2\right)^2$$

$$\frac{dy}{\left(y-2\right)^2} = \frac{1}{3}x\,dx$$

$$\int\left(y-2\right)^{-2}dy = \int\frac{1}{3}x\,dx$$

$$-\frac{1}{y-2} = \frac{1}{6}x^2 + C \quad \Rightarrow \quad \text{Since } f(1)=0,\ \frac{1}{2} = \frac{1}{6} + C \Rightarrow C = \frac{1}{3}$$

$$-\frac{1}{y-2} = \frac{1}{6}x^2 + \frac{1}{3}$$

$$\frac{1}{y-2} = -\left(\frac{1}{6}x^2+\frac{1}{3}\right) \Rightarrow y-2 = -\left(\frac{1}{\frac{1}{6}x^2+\frac{1}{3}}\right) \Rightarrow \boxed{y = 2-\left(\frac{1}{\frac{1}{6}x^2+\frac{1}{3}}\right)}$$

Note: There are *many* very acceptable variations of this solution.