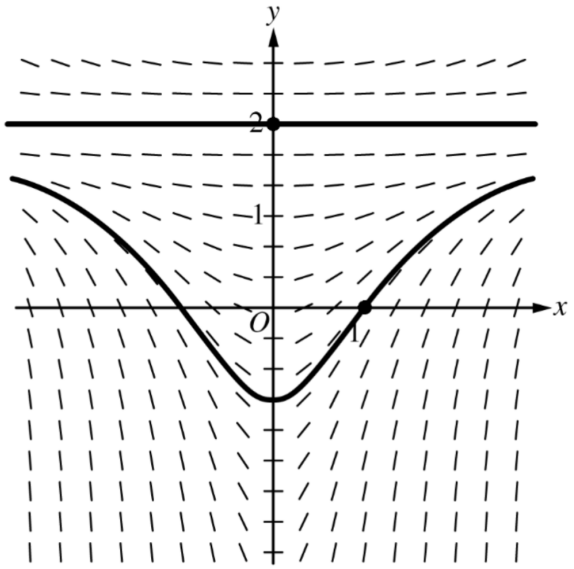
AP CALCULUS PROBLEM SET #14 SLOPE FIELDS ANSWER KEY

1a)

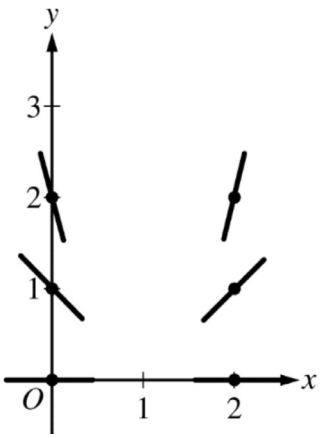


b) At $x=1$ the tangent is $y=\frac{4}{3}(x-1)$

$f(0.7)\approx -0.4$

c) $y=2-\frac{6}{x^2+2}$

2. a)

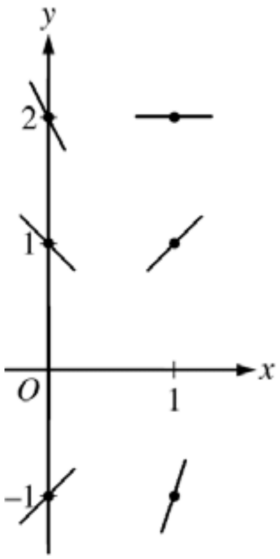


b) At $(2,3)$ the equation of the tangent line is $y=9(x-2)+3$

$f(2.1)\approx 3.9$

c) $y=\frac{1}{\frac{1}{3}-\ln(x-1)}$ or $\frac{3}{1-3\ln(x-1)}$ $\left(\text{valid for } 1<x<e^{\frac{1}{3}}+1\right)$

3. a)



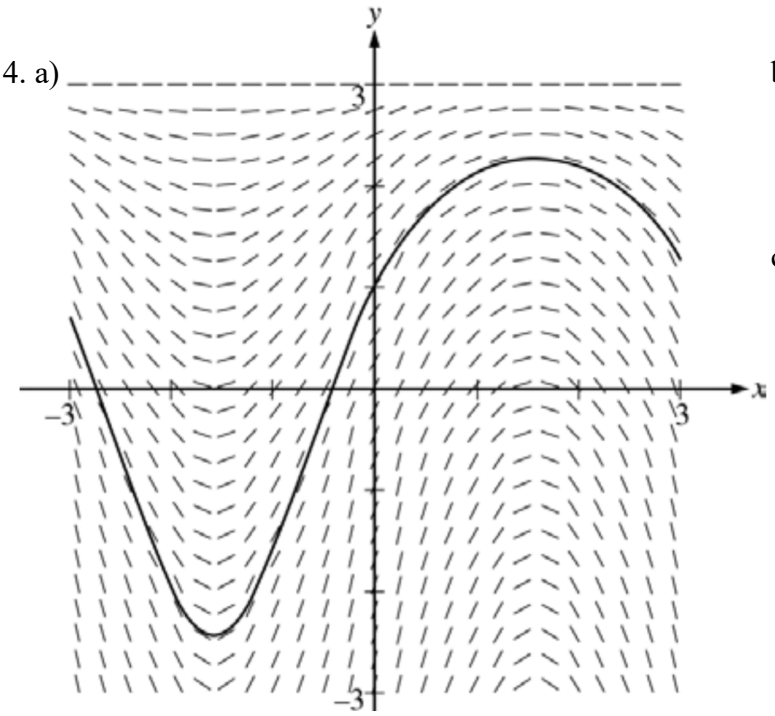
b) $\frac{d^2y}{dx^2}=2-\frac{dy}{dx}=2-(2x-y)=2-2x+y$

c) At $(2,3)$, $\frac{dy}{dx}=1$

f has neither a relative max nor relative min

d) $m=2$ and $b=-2$

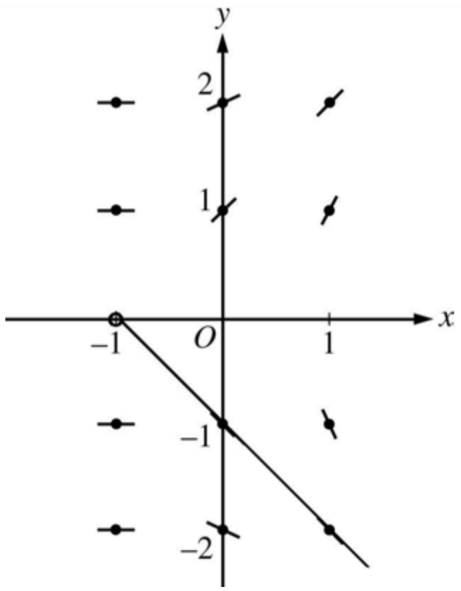
4. a)



b) An equation for the tangent line is $y = 2x + 1$.
$f(0.2) \approx 1.4$

c) $y = 3 - 2e^{-\sin x}$

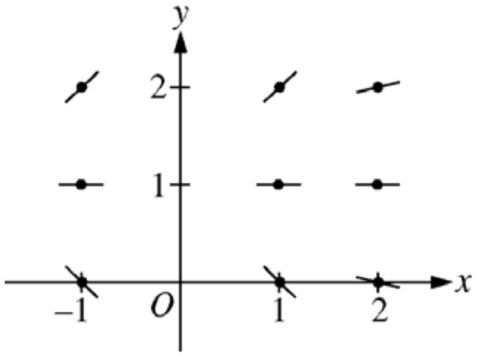
5a)



b) $\frac{dy}{dx} = -1,\ y = -x - 1,\ y \neq 0$

c) $y = -\sqrt{x^2 + 2x + 4}$

6a)



b) $f(x) = 1 - e^{\left(\frac{1}{2} - \frac{1}{x}\right)},\ x > 0$

c) $\lim_{x \to \infty} 1 - e^{\left(\frac{1}{2} - \frac{1}{x}\right)} = 1 - \sqrt{e}$