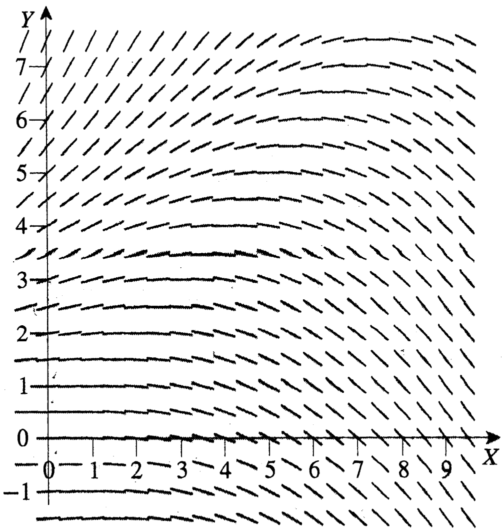
9.3. *On the right is a slope field for some first-order differential equation.*

a *Letting $y = y(x)$ be the solution to this differential equation that satisfies $y(0) = 3$:*

i. *Sketch the graph of this solution.*

ii. *Using your sketch, find (approximately) the value of $y(8)$.*

b. *Sketch the graphs of two other solutions to this unspecified differential equation.*



9.4. *On the right is a slope field for some first-order differential equation.*

a. *Sketch the graphs of the solutions to this differential equation that satisfy*

i. $y(0) = 2$

ii. $y(0) = 4$

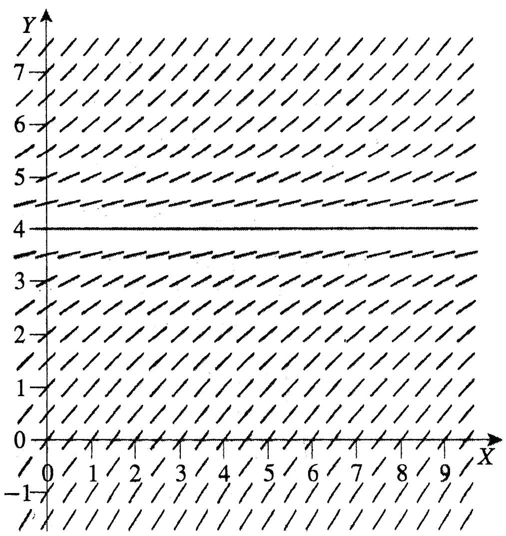
iii. $y(0) = 4.5$

b. *What, approximately, is $y(4)$ if y is the solution to this unspecified differential equation satisfying*

i. $y(0) = 2$?

ii. $y(0) = 4$?

iii. $y(0) = 4.5$?



9.5. *On the right is a slope field for some first-order differential equation.*

a. *Let $y(x)$ be the solution to the differential equation with $y(0) = 5$.*

i. *Sketch the graph of this solution.*

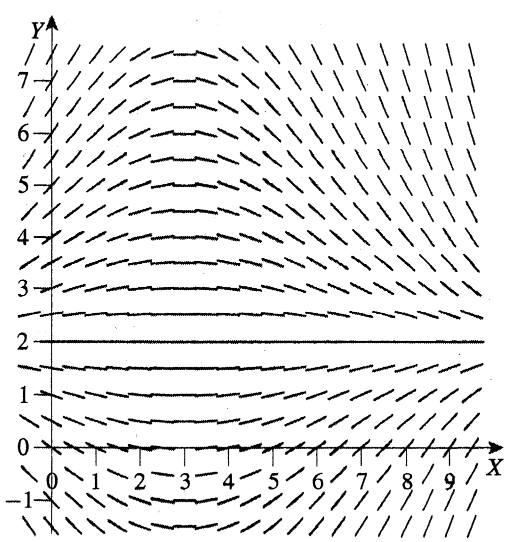
ii. *What (approximately) is the maximum value of $y(x)$ on the interval $(0, 9)$, and where does it occur?*

iii. *What (approximately) is $y(8)$?*

b. *Now let $y(x)$ be the solution to the differential equation with $y(0) = 0$.*

i. *Sketch the graph of this solution.*

ii. *What (approximately) is $y(8)$?*



9.6. *On the right is a slope field for some first-order differential equation.*

a. *Let* $y(x)$ *be the solution to the differential equation with* $y(0) = 2$.

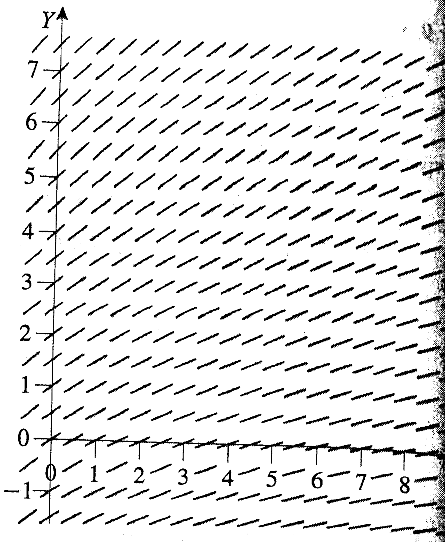
i. *Sketch the graph of this solution.*

ii. *What (approximately) is* $y(3)$ *?*

b. *Now let* $y(x)$ *be the solution to the differential equation with* $y(3) = 1$.

i. *Sketch the graph of this solution.*

ii. *What (approximately) is* $y(0)$ *?*



9.7. *On the right is a slope field for some first-order differential equation.*

a. *Let* $y(x)$ *be the solution to the differential equation with* $y(0) = 4$.

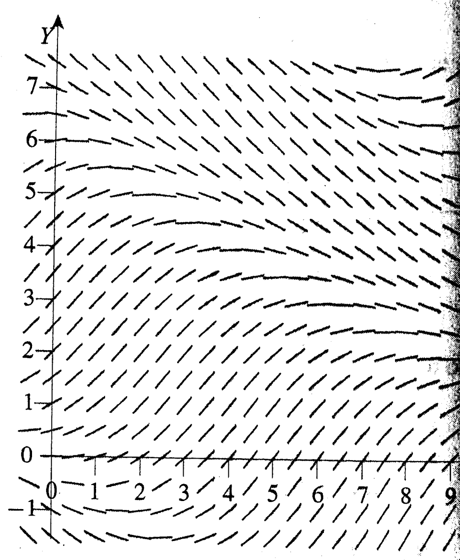
i. *Sketch the graph of this solution.*

ii. *What (approximately) is the maximum value of* $y(x)$ *on the interval* $(0, 9)$, *and where does it occur?*

b. *Now let* $y(x)$ *be the solution to the differential equation with* $y(2) = 0$.

i. *Sketch the graph of this solution.*

ii. *What (approximately) is the maximum value of* $y(x)$ *on the interval* $(0, 9)$, *and where does it occur?*



9.8. *Look up the commands for generating slope fields for first-order differential equatio your favorite computer math package (they may be the same commands for gener "direction fields"). Then:*

i. *Use the computer math package to sketch the indicated slope field for each di ential equation given below,*

ii. *and use the resulting slope field to sketch (by hand) some of the solution curve the given differential equation.*

a. $\frac{dy}{dx} = \sin(x + y)$ *using a* 25×25 *grid on the region* $-2 \leq x \leq 10$ *and* $-2 \leq y \leq$

b. $10\frac{dy}{dx} = y(5 - y)$ *using a* 25×25 *grid on the region* $-2 \leq x \leq 10$ *and* $-2 \leq y$

c. $10\dfrac{dy}{dx} = y(y-5)$ *using a* 25×25 *grid on the region* $-2 \leq x \leq 10$ *and* $-2 \leq y \leq 10$

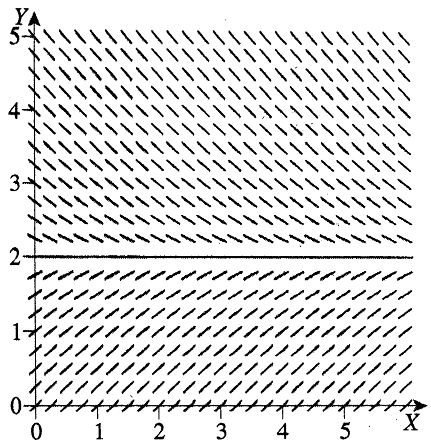
d. $2\dfrac{dy}{dx} = y(y-2)^2$ *using a* 25×17 *grid on the region* $-2 \leq x \leq 10$ *and* $-1 \leq y \leq 3$

e. $3\dfrac{dy}{dx} = (4-y)(y-1)^{4/3}$ *using a* 19×16 *grid on the region* $0 \leq x \leq 6$ *and* $0 \leq y \leq 5$

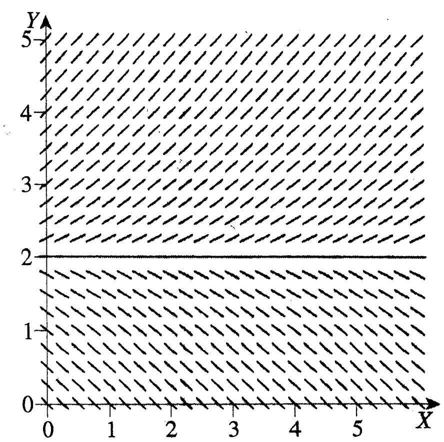
f. $3\dfrac{dy}{dx} = \sqrt[3]{x-y}$ *using a* 25×21 *grid on the region* $-2 \leq x \leq 10$ *and* $-2 \leq y \leq 8$

9.9. *Slope fields for several (unspecified) first-order differential equations have be sketched below. Assume that each horizontal line is the graph of a constant solution to the corresponding differential equation. Identify each of these constant solutions, and, for each constant solution, decide whether the slope field is indicating that it is a stable, asymptotically stable, or unstable constant solution.*

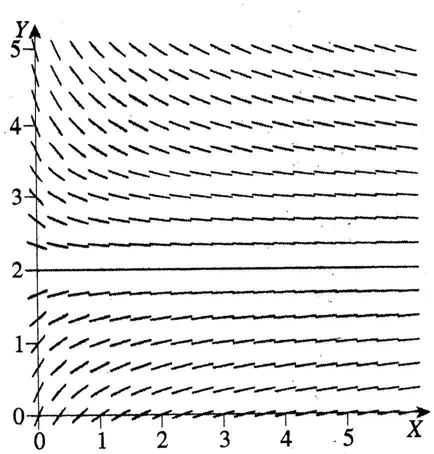
a.



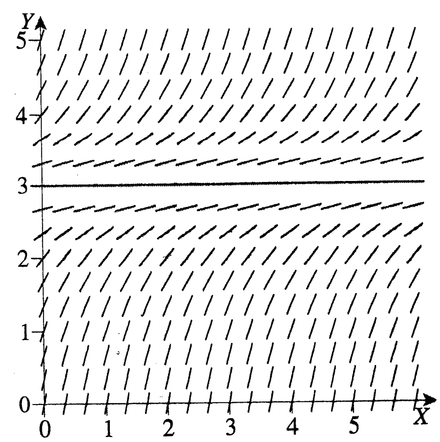
b.



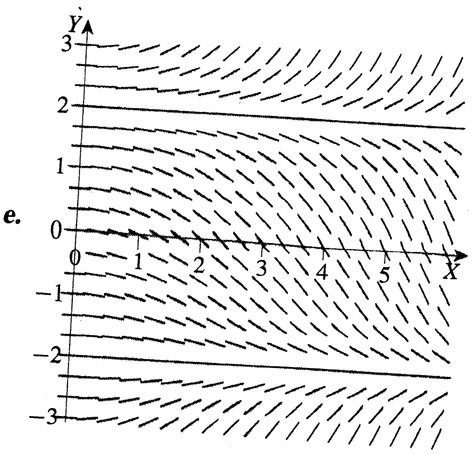
c.



d.



e.



f.