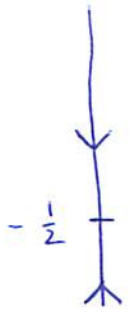
§1.1 HW Solutions

#4. $y' = -1-2y$



$\lim_{t\to\infty} y(t) = -\frac{1}{2}$

(all solns approach $-\frac{1}{2}$).

#5. $y' = 1+2y$

$$\lim_{t\to\infty} y(t) = \begin{cases} +\infty & \text{if } y_0 > -\frac{1}{2} \\ -\frac{1}{2} & \text{if } y_0 = -\frac{1}{2} \\ -\infty & \text{if } y_0 < -\frac{1}{2}. \end{cases}$$

(solutions diverge from $-\frac{1}{2}$, except the soln that is $y = -\frac{1}{2}$)

↑ equilibrium

#15. (j) $y' = 2-y$

#16. (c) $y' = y-2$

#17. (g) $y' = -2-y$

#18. (h) $y' = 2+y$

#19. (h) $y' = y(3-y)$

#20. (e) $y' = y(y-3)$.