Complete the following questions. Try your best to do the problems on your own. If you get stuck ask a friend. Good luck ☺ .

Worksheet 5
Section 2.7

1. For the following DE's,

- Match each DE to their respective direction field. Explain why.
- For the DE for (a) and (d), use its direction field to sketch the graph of the solution that satisfies the initial condition $y(0) = 1$.
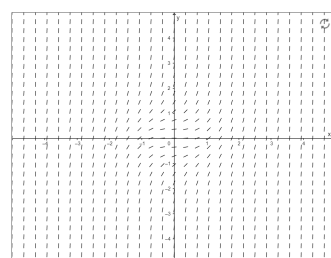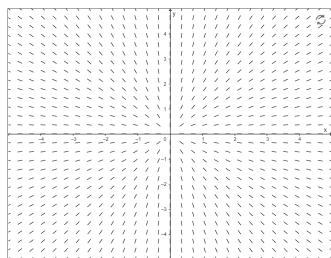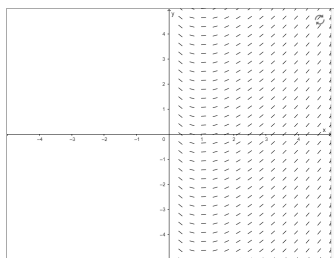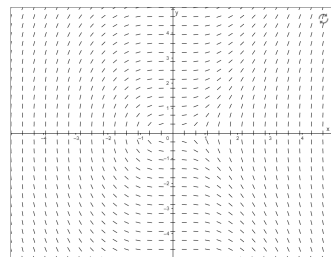
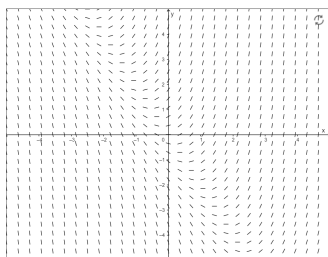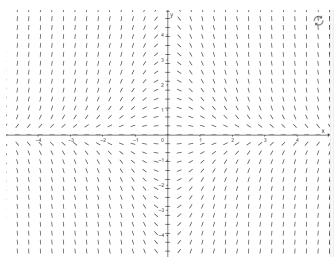(a) $\dfrac{dy}{dx} = -xy$

(b) $\dfrac{dy}{dx} = \dfrac{y}{x}$

(c) $\dfrac{dy}{dx} = x^2 + y^2$

(d) $\dfrac{dy}{dx} = ln|x|$

(e) $\dfrac{dy}{dx} = 2x + y$

(f) $\dfrac{dy}{dx} = \dfrac{x^2}{y}$

2. Use Euler's Method to approximate $y(1.25)$ for the following IVP. Use $h = .25$.
   (Hint: Draw a table.)

$$\begin{cases} y' &= x^2 + y \\ y(0) &= -2. \end{cases}$$

3. Consider the initial value problem

$$\begin{cases} y' &= y - x \\ y(0) &= 3. \end{cases}$$

   Solve the equation numerically using $n = 5$ steps over the interval $0 \le x \le 1$.
   (Hint: Draw a table.)