B) $\frac{dy}{dx} = \frac{(1)(1)}{2} = \frac{1}{2}$

$y - 1 = \frac{1}{2}(x-1)$

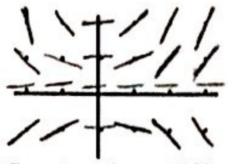
$y = \frac{1}{2}x + \frac{1}{2}$

$f(1.2) = \frac{1}{2}(1.2) + \frac{1}{2} = \frac{11}{10}$

≈ 1.1

17. Consider the differential equation given by $\frac{dy}{dx} = \frac{xy}{2}$.

(A) On the axes provided, sketch a slope field for the given differential equation.



(B) Let f be the function that satisfies the given differential equation. Write an equation for the tangent line to the curve $y = f(x)$ through the point (1, 1). Then use your tangent line equation to estimate the value of $f(1.2)$.

(C) Find the particular solution $y = f(x)$ to the differential equation with the initial condition $f(1) = 1$. Use your solution to find $f(1.2)$.

→ underestimate

(D) Compare your estimate of $f(1.2)$ found in part (b) to the actual value of $f(1.2)$ found in part

(E) Was your estimate from part (b) an underestimate or an overestimate? Use your slope field to explain why. Concave up → tangent line is underestimate

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18. Consider the differential equation given by $\frac{dy}{dx} = \frac{x}{y}$.

(A) On the axes provided, sketch a slope field for the given differential equation.

c)

$\int y\,dy = \int x\,dx$

$2 \cdot \frac{y^2}{2} = \left(\frac{x^2}{2} + C\right) 2$

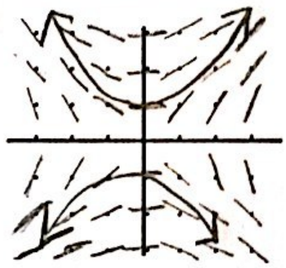
$\sqrt{y^2} = \sqrt{x^2 + C}$

$y = \pm\sqrt{x^2 + C}$

$1 = \pm\sqrt{0 + C}$

$C = 1$

$y = \sqrt{x^2 + 1}$



e) $y = -\sqrt{x^2 + 1}$

(B) Sketch a solution curve that passes through the point (0, 1) on your slope field.

(C) Find the particular solution $y = f(x)$ to the differential equation with the initial condition $f(0) = 1$.

(D) Sketch a solution curve that passes through the point $(0, -1)$ on your slope field.

(E) Find the particular solution $y = f(x)$ to the differential equation with the initial condition $f(0) = -1$.

c) $dy = \frac{1}{2}xy\,dx$

$\int \frac{1}{y}\,dy = \int \frac{1}{2}x\,dx$

$\ln|y| = \frac{1}{2} \cdot \frac{x^2}{2} + C$

$e^{\frac{1}{4}x^2 + C} = |y|$

$y = \pm e^{\frac{1}{4}x^2 + C}$

$1 = \pm e^{\frac{1}{4} + C}$

$\ln 1 = \ln e^{\frac{1}{4} + C}$

$0 = \ln e^{\frac{1}{4} + C}$

$1 = e^{\frac{1}{4} + C}$

$\frac{1}{4} + C = 0$

$C = -\frac{1}{4}$

$y = e^{\frac{1}{4}x^2 - \frac{1}{4}}$

$f(1.2) \approx 1.116$