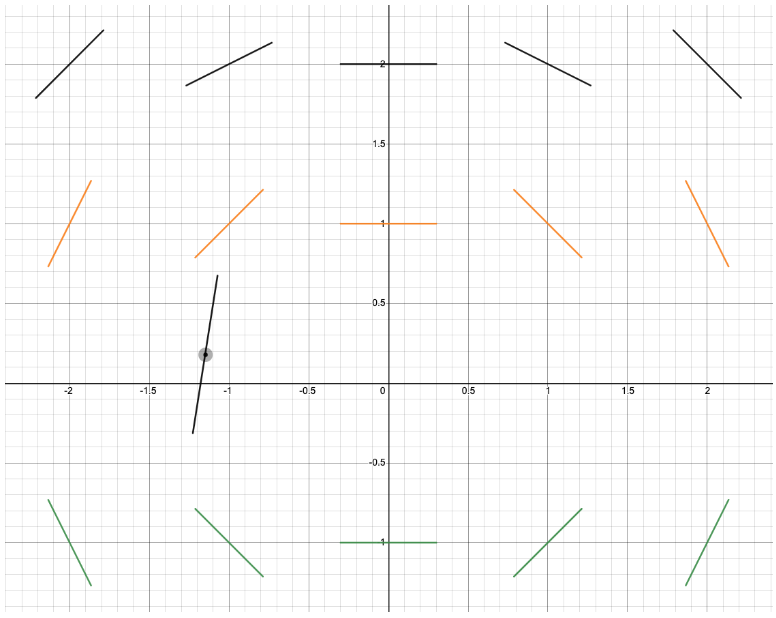
1. **A**



B The slopes will be negative in I. and III. quadrants because $\frac{dy}{dx} < 0$ for those xy values.

C To find the line tangent to $f(1)$ first we need to solve for $f'(1)$.

$$f'(1) = \frac{dy}{dx}|_{x=1;y=-1} = 1$$

Now we find the slope equation.

$$y - 1 = 1(x - 1)$$
$$L(x) = x - 2$$

Now we find the approximation for $f(1.2)$

$$L(1.2) = 1.2 - 2 = -0.8$$

D First we need to findthe general equation of the differential equation.

$$\frac{dy}{dx} = -\frac{x}{y}$$
$$\int ydy = \int -xdx$$
$$y^2 = -x^2 + C$$
$$y = \pm\sqrt{-x^2 + C}$$

Now we'll find C

$$1 = -\sqrt{-1 + C}$$
$$C = 2 \Rightarrow \text{ There's not a solution for } + \sqrt{-x^2 + C}$$

Our solution with the given initial condition is $y = -\sqrt{-x^2 + 2}$

2. **A** To estimate amount of product after a quarter of a year. We need to find the $A'(0)$

$$A'(0) = \frac{dA}{dt}|_{t=0;A=1100} = 100$$

Now we'll use the point-slope formula to find the tangent line and then substitute for $t = 1/4$.

$$A - 1100 = 100t$$
$$A = 100t + 1100$$
$$L(\frac{1}{4}) = 100 \cdot \frac{1}{4} + 1100 = 1125\, tons$$

B Solve for $\frac{d^2y}{dt^2}$.

$$\frac{d^2y}{dt^2} = \frac{d}{dt}(\frac{A}{10} - 10) = \frac{1}{10}\frac{dA}{dt} = \frac{1}{100}(A - 10)$$

We can see that the second derivative will be greater than zero at $t = 1/4$. So the graph will be concave up there. That means that our approximation is an underestimation.

C We'll solve the differential equation with initial condition $A(0) = 1100$.

$$\frac{dA}{dt} = \frac{1}{10}(A - 100)$$
$$\int (A - 100) dA = \int \frac{1}{10} dt$$
$$ln|A - 100| = \frac{t}{10} + C$$
$$A - 100 = Ce^{\frac{t}{10}}$$
$$A = 1100e^{\frac{t}{10}} + 100 \Rightarrow \text{ Because } C = A(0)$$