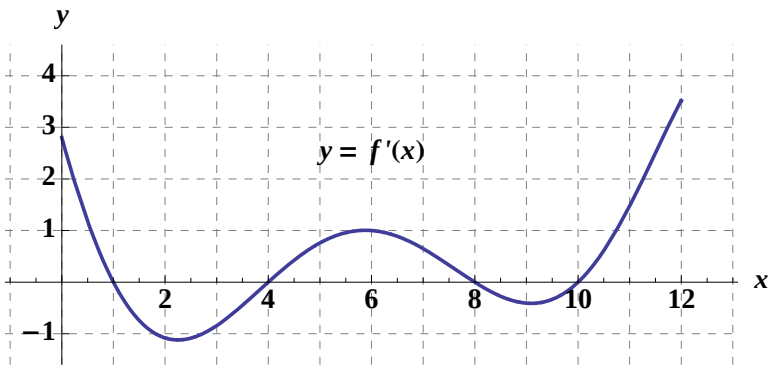
Problems:

1. Let $f(x)$ be an unknown function. But you do know that the line $2x + 3y = 12$ is tangent to the graph of $y = f(x)$ at the point $(3, 2)$. Find $f(3)$ and $f'(3)$ and explain how you got your answer.

2. Let $P(t)$ be the population (in thousands) of Kurdistan where t is the number of years after 1950. In this context, what does the statement $P'(25) = 16.5$ mean? Be sure to include the units in your answer. Also be sure to tell me what $t = 25$ means in the context of the problem—i.e. what year are we talking about?

3. The graph of the **derivative** of the function f is given below. Use this graph to answer the following questions.



WARNING

The graph is for y = f'(x)

It is NOT the graph for f(x)!

(a) On what intervals is f decreasing? Explain your answer.

(b) Note that $f'(4) = 0$. Does f have a local extreme point at $x = 4$? If f does have a local extreme point at $x = 4$, is it a local maximum or a local minimum? Justify your answer carefully.

(c) Is f concave up or concave down when $6 < x < 9$? Justify your answer carefully.