10. [7 points] The curve $\mathcal{C}$ is given by the equation $e^{\cos(x^2-y^2)} = ex$.

a. [2 points] Which of the following points (x, y) lie on the curve $\mathcal{C}$? Circle all correct answers.

$(1, 1)$ $(-1, 1)$ $(1, -1)$ $\left(0, \sqrt{2}\right)$ NONE OF THESE

b. [5 points] Compute $\dfrac{dy}{dx}$. Show every step of your work and circle your final answer.

11. [8 points]

Suppose $h(x)$ is a function such that $h(x)$ has **exactly three** critical points. Assume that both $h(x)$ and $h'(x)$ are differentiable on $(-\infty, \infty)$. A table of values is given to the right.

x	0	3	5	7
$h(x)$	2	?	4	4
$h'(x)$	-1	0	0	?

a. [2 points] Note that $h(x)$ satisfies the hypotheses of the Mean Value Theorem on $[5, 7]$. Briefly explain why the conclusion of this theorem implies that one of the three critical points of $h(x)$ must be in the interval $5 < x < 7$.

In the parts below, circle all correct answers. No justification is needed.

b. [2 points] On which of the following intervals *must* $h(x)$ be increasing on the entire interval?

$(0, 3)$ $(3, 5)$ $(5, 6)$ $(6, 7)$ NONE OF THESE

c. [2 points] Which of the following *could* be the x-coordinate of a global minimum of $h(x)$ on $(-\infty, \infty)$?

$x = 0$ $x = 3$ $x = 5$ $x = 6$ NONE OF THESE

d. [2 points] Also suppose that $h(x)$ is concave down on $(-\infty, 0)$. Which of the following *could* be the value of $h(-2)$?

1 2 3 4 5 NONE OF THESE