10. [4 points] An implicit curve is described by the equation
\[ xy^n = \cos(ax) \]
where \( a \) and \( n \) are positive constants. Compute \( \frac{dy}{dx} \). Your answer may include \( a \) and \( n \). You must show every step of your work.

**Solution:**

\[
\frac{d}{dx}(xy^n) = \frac{d}{dx}(\cos(ax)) \\
x \cdot (ny^{n-1}\frac{dy}{dx}) + 1 \cdot y^n = -a \sin(ax) \\
(nxy^{n-1}) \frac{dy}{dx} = -a \sin(x) - y^n \\
\frac{dy}{dx} = \frac{-a \sin(x) - y^n}{nxy^{n-1}}
\]

**Answer:** \( \frac{dy}{dx} = \frac{-a \sin(x) - y^n}{nxy^{n-1}} \)

11. [8 points] The differentiable function \( f(x) \) is defined for all real numbers. Additionally, \( f(x) \) has **exactly two** critical points, at \( x = 0 \) and \( x = 5 \). A table of values of \( f(x) \) is given below.

<table>
<thead>
<tr>
<th>( x )</th>
<th>( f(x) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>7</td>
<td>5</td>
</tr>
</tbody>
</table>

For parts a–d., circle all correct choices.

a. [2 points] On which of the following interval(s) must \( f'(x) \) always be negative?

(-2, 0) \( \) \( \boxed{0, 1} \) \( \boxed{1, 5} \) \( \boxed{5, 7} \) NONE OF THESE

b. [2 points] On which of the following interval(s) must there be a point \( c \) for which \( f'(c) = -1 \)?

(-\( \infty \), -2) \( \) \( \boxed{-2, 1} \) \( \boxed{1, 3} \) \( \boxed{3, 7} \) NONE OF THESE

c. [2 points] On the interval [0, 6], at which of the following point(s) does \( f(x) \) attain its global maximum? If there is not enough information to determine this, circle NOT ENOUGH INFO.

\( x = 0 \) \( \boxed{x = 1} \) \( \boxed{x = 5} \) \( x = 6 \) NOT ENOUGH INFO

d. [2 points] On the interval [-2, 5], at which of the following point(s) does \( f(x) \) attain its global minimum? If there is not enough information to determine this, circle NOT ENOUGH INFO.

\( x = -2 \) \( \boxed{x = 0} \) \( \boxed{x = 2} \) \( \boxed{x = 5} \) NOT ENOUGH INFO