On your Marks: Torches heat a thin $10'' \times 10''$ aluminum plate between $100°F$ and $106°F$. Your surface represents the plate's temperature. Label two points on the surface for each condition below:

1. $\frac{\partial T}{\partial x} < 0$ and $\frac{\partial T}{\partial y} < 0$
2. $\frac{\partial T}{\partial x} > 0$ and $\frac{\partial T}{\partial y} < 0$
3. $\frac{\partial T}{\partial x} < 0$ and $\frac{\partial T}{\partial y} > 0$
4. $\frac{\partial T}{\partial x} = 0$ and $\frac{\partial T}{\partial y} > 0$

Get Set: Pick a point on your surface satisfying the second condition above. Using the measurement tool, find the rates $\frac{\partial T}{\partial x}$ and $\frac{\partial T}{\partial y}$ at your point. (1 vertical inch = $1°F$.) Include units.

$$\frac{\partial T}{\partial x} = _____ \qquad \frac{\partial T}{\partial y} = _____$$

Go: For the contour map below, rank the points based on the value of $\frac{\partial T}{\partial x}$ or $\frac{\partial T}{\partial y}$.

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Go: For each contour map below, rank the points based on the value of $\frac{\partial T}{\partial x}$ or $\frac{\partial T}{\partial y}$ at each point.

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$\frac{\partial T}{\partial x}$ Neg. ____ ____ ____ Pos.

$\frac{\partial T}{\partial y}$ Neg. ____ ____ ____ Pos.

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$\frac{\partial T}{\partial x}$ Neg. ____ ____ ____ Pos.

$\frac{\partial T}{\partial y}$ Neg. ____ ____ ____ Pos.

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$\frac{\partial T}{\partial x}$ Neg. ____ ____ ____ Pos.

$\frac{\partial T}{\partial y}$ Neg. ____ ____ ____ Pos.

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