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3. Review curves

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Review

Level curves question



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well, one thing that we learned is that if you have a function, then the gradient of the function is perpendicular to the level curves. Let me scribe that. So here's something that we know. For any function g , the gradient of g is perpendicular to the level curves. So if this curve C was a level curve of some function, then we could use this method to find the normal vector. So now I have a question for all of you. C is a level curve of which function? Is it the function x squared? Or is it the function y plus x squared? Or is it the function x squared minus y ?

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Consider the curve C , which is the parabola $y = x^2$. Find a normal vector to this parabola at the point $(1, 1)$.

We know that the gradient is normal to level curves. So if we can describe C as the level curve of a function, we have a tool, the gradient, to find a normal vector.

Which curve is the level curve?

0 points possible (ungraded)
The parabola $y = x^2$ is a level curve of which of the following functions?

☐ x^2

☐ $y + x^2$

☒ $x^2 - y$



Solution:

The parabola $y = x^2$ can be written as the level curve of a function by moving all terms to one side. Subtracting a y from both sides we get $0 = x^2 - y$, thus the function $x^2 - y$ has the parabola $y = x^2$ as a level curve of height 0 .

(Also, see the video on the following page.)

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