1. Suppose $5x^3y - 3xy^2 + y^3 = 6$. $(1,2)$ is a point on this curve. Is the curve concave up or concave down at $(1,2)$?

**Explicit way to go** $y$ *can* be solved as a function of $x$.* Then you can differentiate the formula twice and evaluate when $x = 1$.

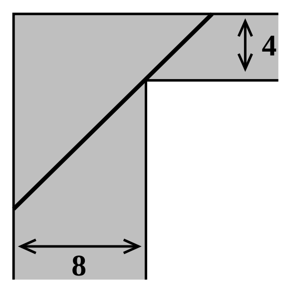
**Implicit way to go** Find $\frac{dy}{dx}$ implicitly and then differentiate again to get $\frac{d^2y}{dx^2}$. Evaluate everything at $(1,2)$.

2. Questions about asymptotic growth "near" $\infty$ occur naturally when computer scientists analyze algorithms. One seemingly simple problem is sorting. How many comparisons are required to sort a list of $n$ numbers? *Sorting and Searching*, volume 3 of *The Art of Computer Programming*, by D. Knuth, gives the following average running times for several sorting algorithms as a function of $n$:

| Name | Running time |
|---|---|
| Comparison | $4n^2 + 10n$ |
| Merge exchange | $3.7n(\ln n)^2$ |
| Heapsort | $23.08n \ln n + 0.2n$ |

Which sorting method would you rather use if, in your application, $10 \le n \le 20$ (e.g., sorting a bridge hand)? Which would you rather use if $100 \le n \le 150$ (e.g., sorting grades in a lecture course)? Which would you rather use if $n \approx 10^6$ (e.g., sorting license plate numbers in New Jersey)? What happens to these functions as $n \to \infty$?

3. Find the maximum length of a pole that can be carried around a corner joining corridors of width 8 ft and 4 ft. (This is problem 59 of section 4.6 in the text.)

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One problem will be selected for a writeup to be handed in at the next recitation meeting. Please see Professor Greenfield's Math 151 webpage to learn which problem to hand in. This week only there will be a **VERY SPECIAL OFFER** which you should consider carefully.

* Here it is (really!):

$$y = \left(-\frac{5}{2}x^4 + 3 + x^3 + \frac{1}{18}\sqrt{1500x^9 - 675x^8 - 4860x^4 + 2916 + 1944x^3}\right)^{1/3} - \frac{\frac{5}{3}x^3 - x^2}{\left(-\frac{5}{2}x^4 + 3 + x^3 + \frac{1}{18}\sqrt{1500x^9 - 675x^8 - 4860x^4 + 2916 + 1944x^3}\right)^{1/3}} + x$$