

Day 5 (July 11, 2011)

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Problem #1

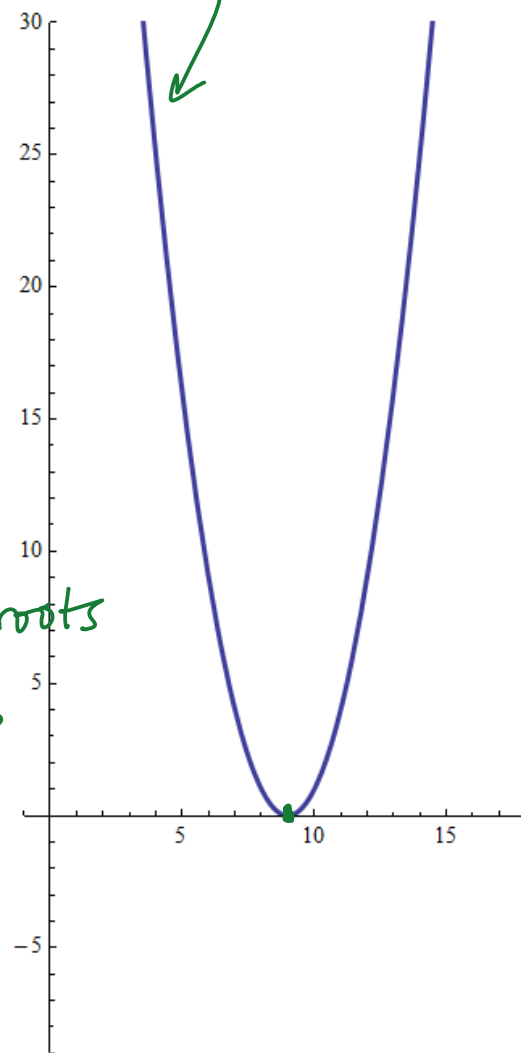
$$f(x) = x^2 - ax + 81$$

a = sum of two numbers

81 = product of two numbers

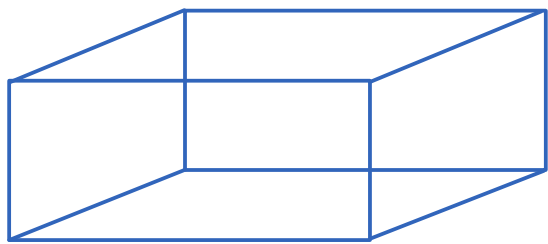
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roots of this quadratic

$a = 18$ is the smallest real #
for which the quadratic has real roots
and when $a = 18$, the parabola is
tangent to the x -axis



$\therefore a = 18$ is the smallest possible sum

Bonus Box Bonanza!



4 by 10 by 15

Find a box that is similar to this one that has the same numerical value for volume and surface area.

The volume of a 4 by 10 by 15 box is 600 units³ and the surface area is 500 units².

The 40 by 100 by 150 box has 1,000 times volume, 100 times surface area, so our desired box is smaller.

Multiply dimensions by $\frac{5}{6}$...

But wait!! What's up with $(x-4)(x-10)(x-15)$?
Expand this...