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Discovery or Invention?

Happy Trails

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Abstract: An allegory of modern science.

Happy Trails



*Roll me over and turn me around Let me keep spinnin' till I hit the ground...
Roll me over and set me free The cowboy's life is the life for me*

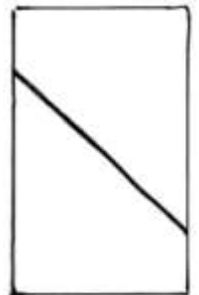
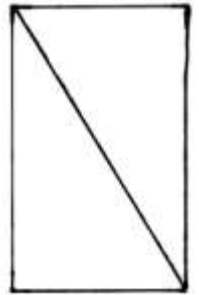
Howdy, Roy! Crazy world, ain't it? Virus, election rustlers, donkeys payin' mules to elect an Equus asinus, (oh, to brand those rascal's behinds and throw 'em in the calaboose!), ordinary folks wearin' masks lookin' like bank robbers, soaring gas prices. But in spite of it all, me and Hank are havin' a mighty good time. I know you always said Hank was useless...but guess what, pardner? You CAN teach an old dog new tricks! I taught him how to drive! Yep, ol' Hank finally got the hang of it; he's got the reins now atop ol' Champ! And ridin' along—sittin' in the back seat, so to speak—has given me a whole new view on life and the world in general. Sounds a little loco, but I even had this wild notion about fixin' calculus. It's all based on the equation for the area of a triangle. Lemme show you.

If I draw a diagonal from the corners of a rectangle, the area of each triangle is half the area of the rectangle—half the base times the height:

$$\text{Area of Triangle} = \frac{(\text{base})(\text{height})}{2}$$

Pretty doggone easy. And I can also use the rectangle to find the area of another shape. Say I draw a line, like so, inside a rectangle. Once again, the area of the top half is equal to the area of the bottom half. So just like the triangles, the area of each trapezoid is half the area of a rectangle—half the base times the height:

$$\text{Area of Trapezoid} = \frac{(\text{base})(\text{height})}{2}$$



Try another image.

Again, with the top half equal to the bottom half, the area of each shape is half the area of the rectangle—half the base times the height:

$$\text{Area} = \frac{(\text{base})(\text{height})}{2}$$

And, by golly, this also works with a curve.

If I draw a curve inside the rectangle—with the area of the top half equal to the area of the bottom half—the area of each (curved shape) is half the area of the rectangle: half the base times the height! Wild, isn't it?

The equation for the area under the curve is the same as for a triangle!

$$\text{Area} = \frac{(\text{base})(\text{height})}{2}$$

Yippy ki-yi-yay! Finding the area under a curve without using calculus! Now, I know you're probably not as excited as me...but Hank can't stop waggin' his tail!

It's so simple, the way I like to see things—the positive and the negative. Just like those ol' yin and yang images: the area of each "shape" is half the area of the rectangle!

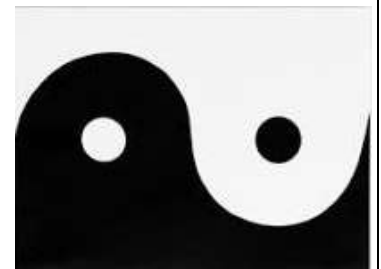
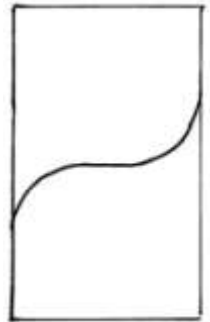
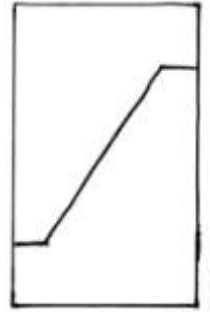
Sure a lot easier than all those functions and derivatives of calculus. But get rid of the golden calf? Hmm, Confucius say: man who leap off cliff jump to conclusion! So maybe I need to think this over a bit.

Fun way to do math, though. I can even find the area under a sine wave this way.

Sure, if I put the symmetrical shape of a sine wave within a rectangle, the area under the curve is half the rectangle—half the base times the height:

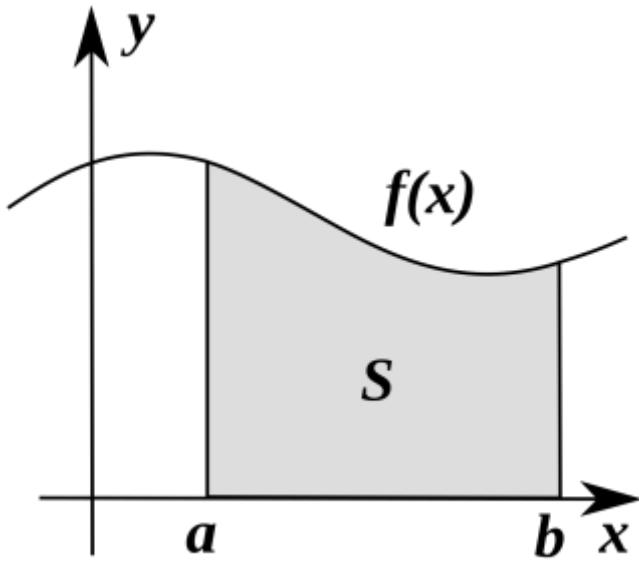
$$\text{Area} = \frac{(\text{base})(\text{height})}{2}$$

Yep, integral calculus made easy! Might not get rid of all calculus, but it's a start! All I have to do is create a mirrored symmetrical image of the curve within a rectangle, and voilà!



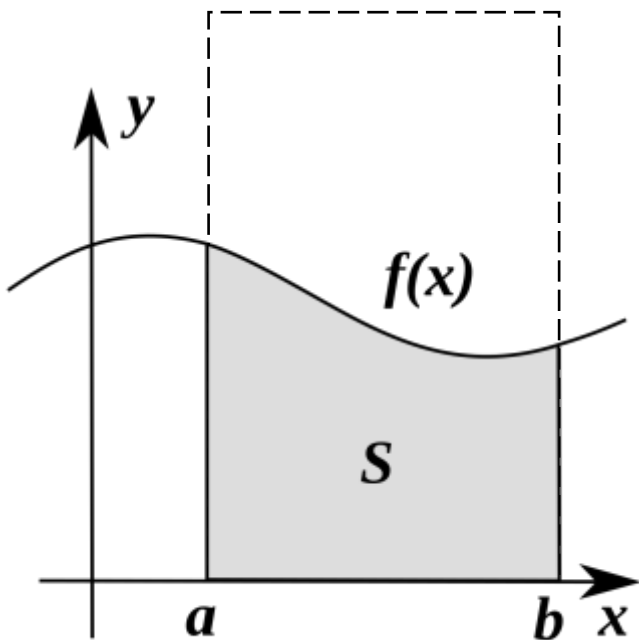
I think I got this pretty well corralled. But before I skedaddle, Pard, I gotta ask ya:
Would you rather calculate the approximate area under a curve using the calculus equation:

$$S = \int_a^b f(x) dx$$



Or calculate the exact area under a curve using a simple equation for half a rectangle?

$$\text{Area of } S = \frac{(\text{base})(\text{height})}{2}$$



And I'll leave you with a problem: How can this method be used with non-symmetrical curves? Maybe adjust and move the rectangle, or extend and mirror the curve? Hmm...Hank says, "Choose wisely, young grasshopper!"