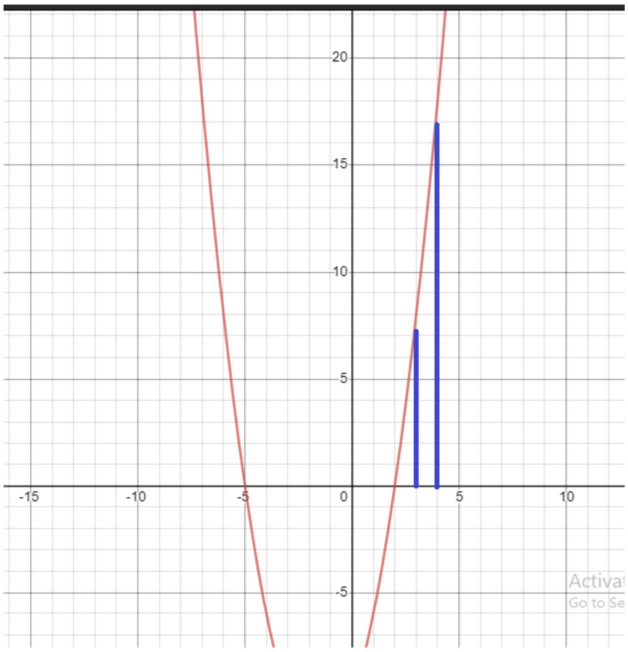
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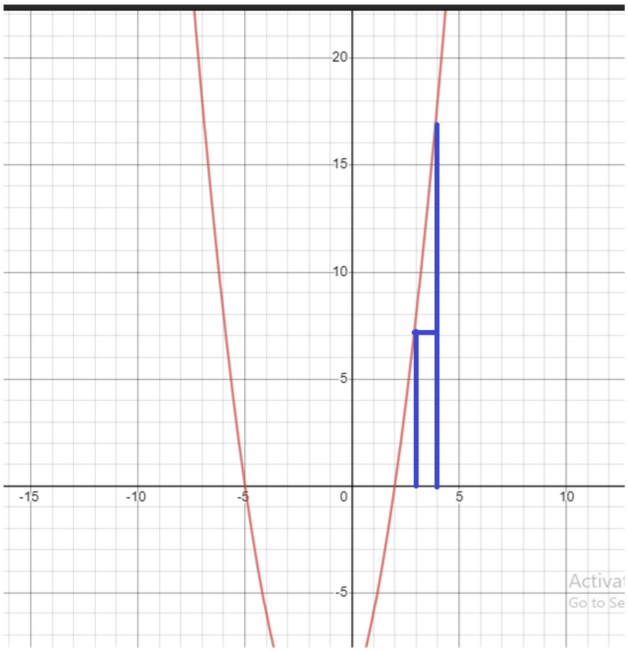
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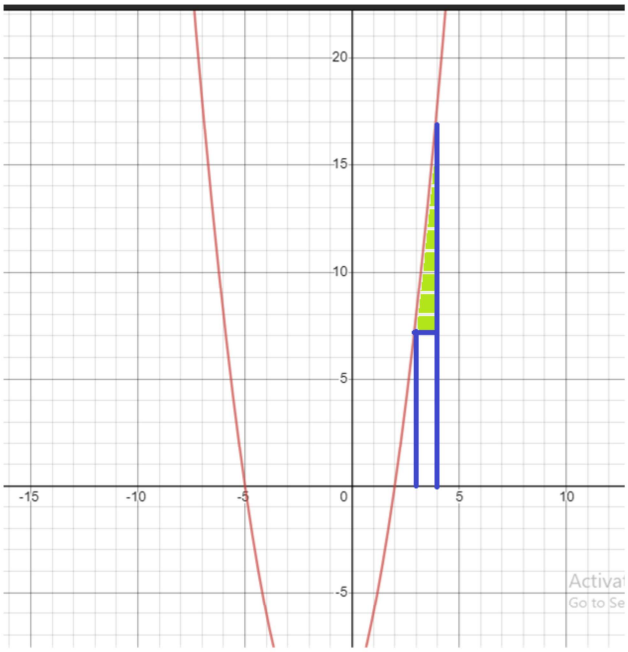
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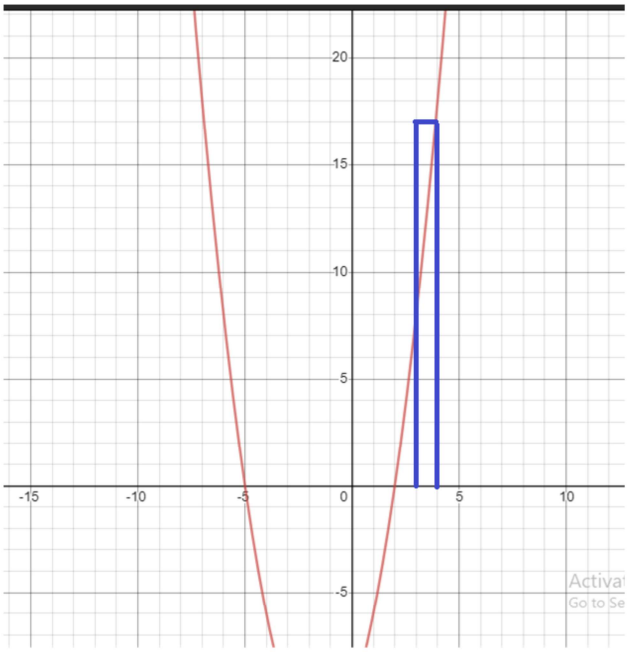
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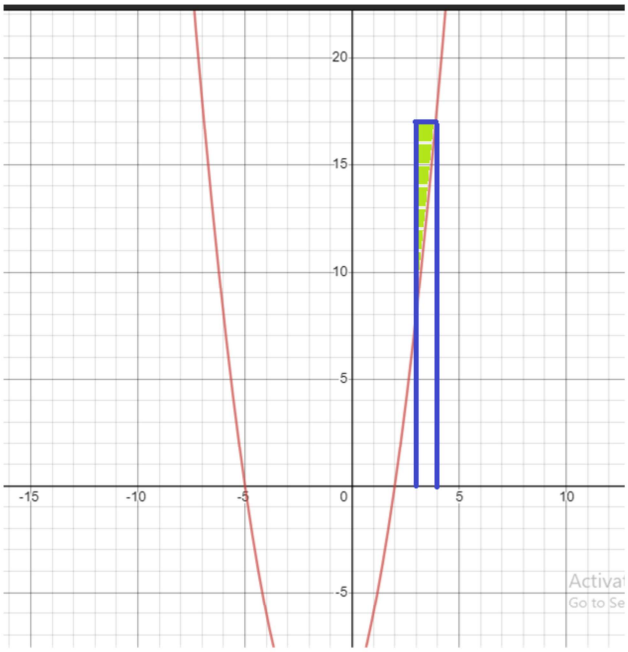
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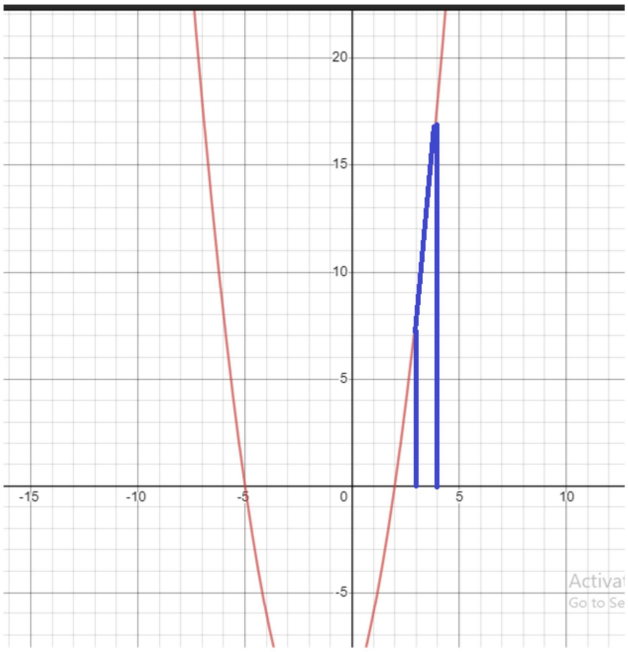
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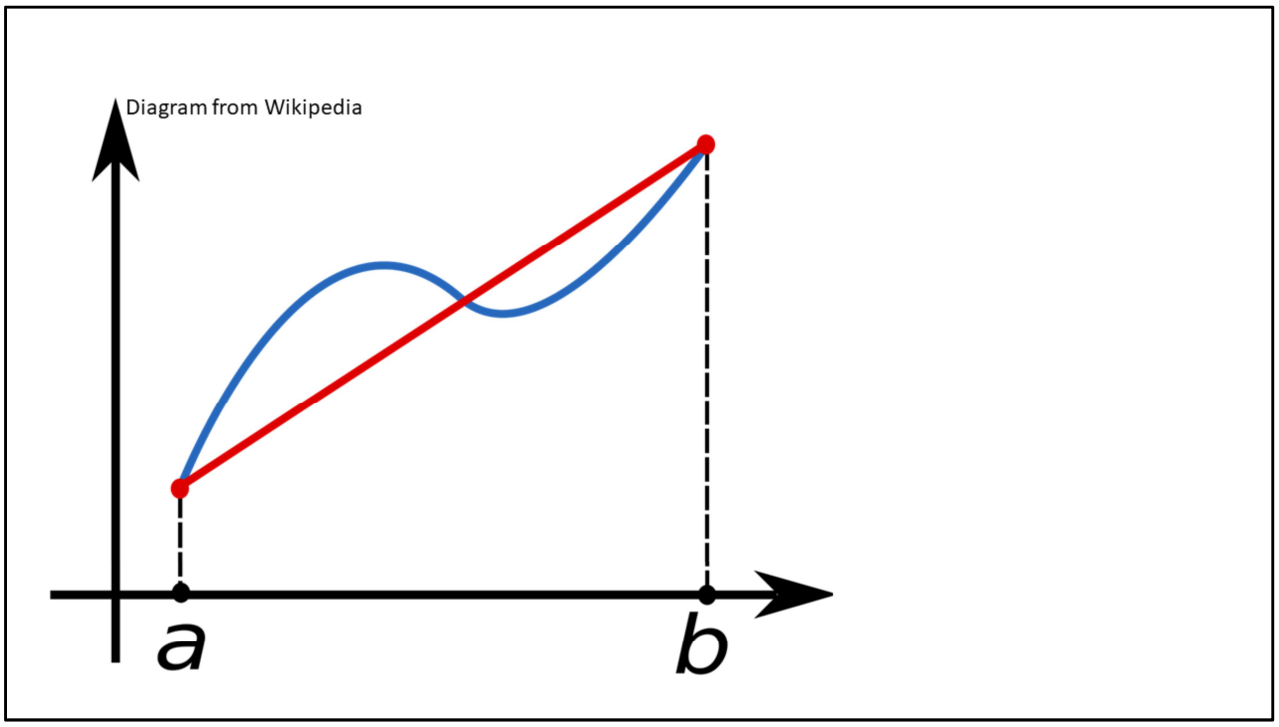
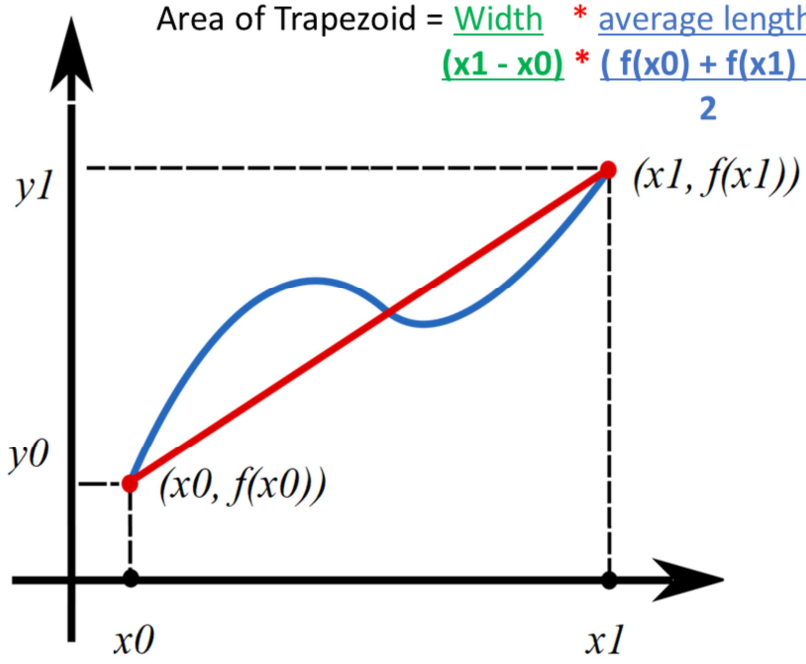


Diagram from Wikipedia
a
b

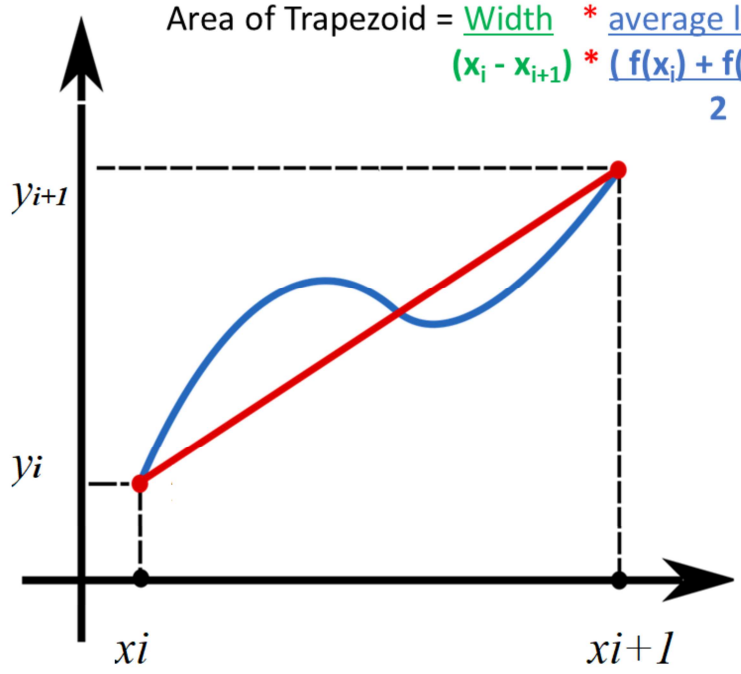
Area of Trapezoid = Width * average length of two parallel lines

$$(x1 - x0) * \frac{(f(x0) + f(x1))}{2}$$



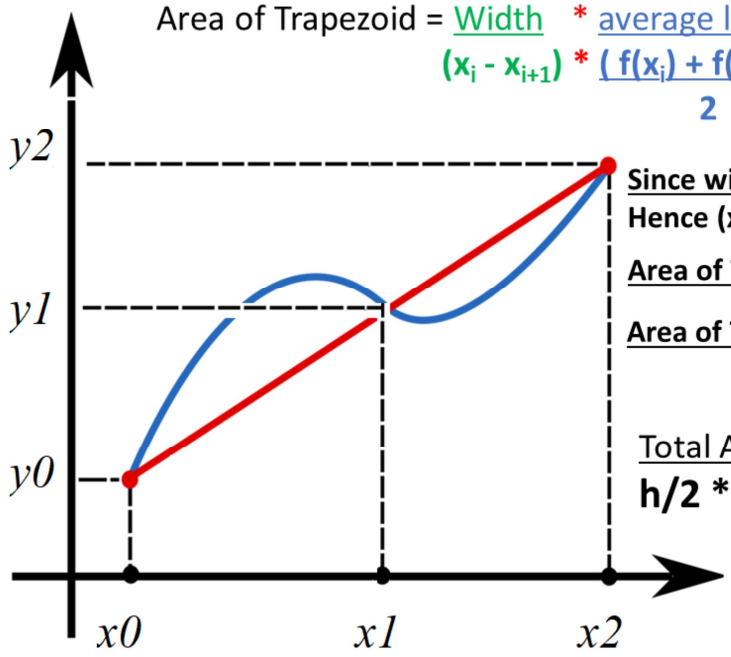
Area of Trapezoid = Width * average length of two parallel lines

$(x_i - x_{i+1}) * \frac{(f(x_i) + f(x_{i+1}))}{2}$



Area of Trapezoid = Width * average length of two parallel lines

$(x_i - x_{i+1}) * \frac{(f(x_i) + f(x_{i+1}))}{2}$



Since widths of two trapezoids are equal

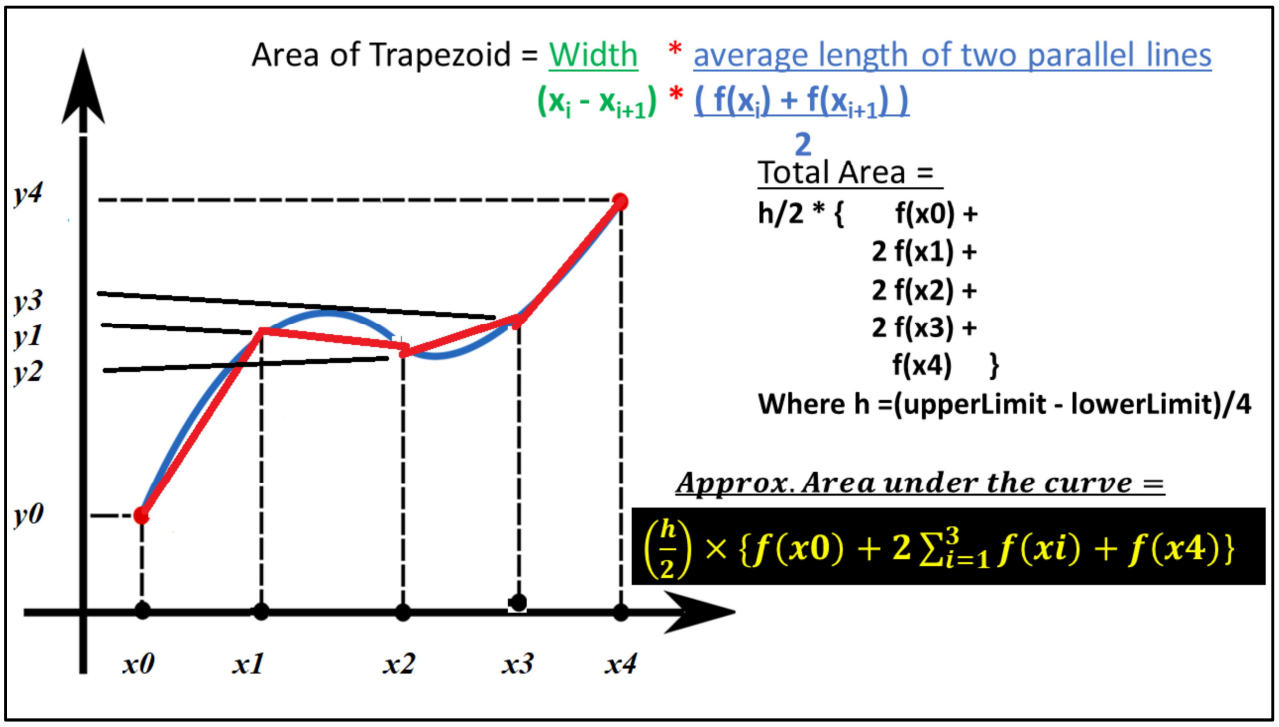
Hence (x1-x0) = (x2 - x1) = h

Area of Trapezoid 1 = h/2 * (f(x0) + (f(x1))

Area of Trapezoid 2 = h/2 * (f(x1) + (f(x2))

Total Area =

h/2 * { f(x0) + 2 f(x1) + f(x2)}


Area of Trapezoid = Width * average length of two parallel lines
$(x_i - x_{i+1}) * \frac{(f(x_i) + f(x_{i+1}))}{2}$
Total Area =
h/2 * { f(x0) +
2 f(x1) +
2 f(x2) +
2 f(x3) +
f(x4) }
Where h =(upperLimit - lowerLimit)/4
$Approx.\ Area\ under\ the\ curve = \left(\frac{h}{2}\right) \times \{f(x0) + 2\sum_{i=1}^{3} f(xi) + f(x4)\}$
y4
y3
y1
y2
y0
x0
x1
x2
x3
x4

$$\left(\frac{h}{2}\right) \times \{f(x0) + 2\sum_{i=1}^{3} f(xi) + f(x4)\}$$

If n is used in place of 4 (or in other words, n=4)

$$\left(\frac{h}{2}\right) \times \{f(x0) + 2\sum_{i=1}^{n-1} f(xi) + f(xn)\}$$

The above formula is an approximation of definite integral. This approximation gets closer to actual values when n is increased