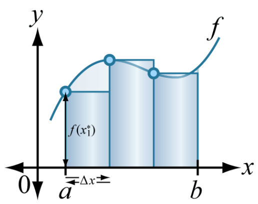
Selected properties of definite integrals and antiderivatives

(provided that f and g are continuous)

<table>
<tr><th>Example</th><th>Property for definite integrals</th><th>Property for antiderivatives</th></tr>
<tr><td>


</td><td>

$$\int_b^a f(x)\,\mathrm{d}x = -\int_a^b f(x)\,\mathrm{d}x$$

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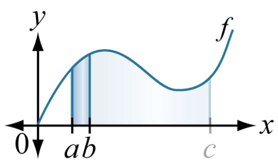
<tr><td>


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$$\int_a^a f(x)\,\mathrm{d}x = 0$$

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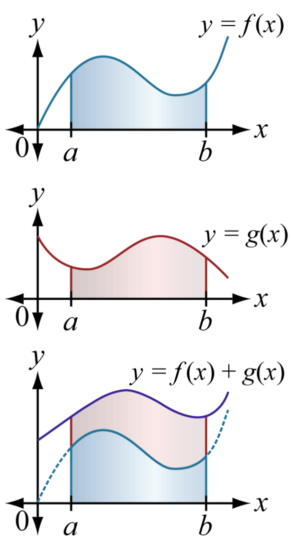
<tr><td>


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$$\int_a^b [f(x) \pm g(x)]\,\mathrm{d}x = \int_a^b f(x)\,\mathrm{d}x \pm \int_a^b g(x)\,\mathrm{d}x$$

</td><td>

$$\int [f(x) \pm g(x)]\,\mathrm{d}x = \int f(x)\,\mathrm{d}x \pm \int g(x)\,\mathrm{d}x$$

</td></tr>
</table>

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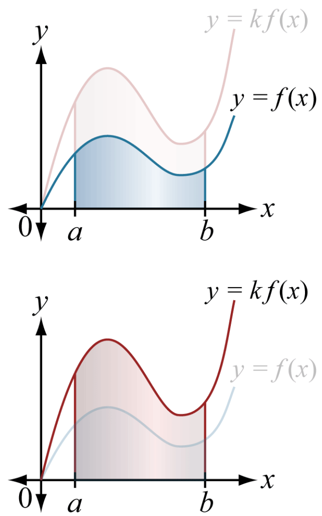
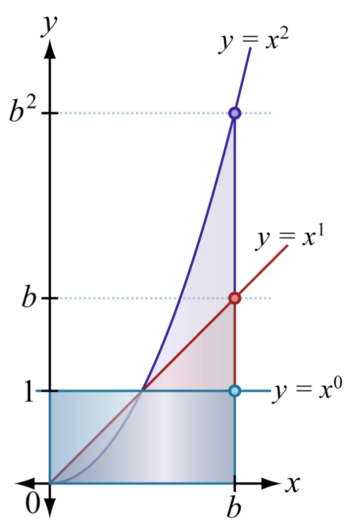
<tr><td>
</td><td>$$\int_a^b k\, f(x)\,\mathrm{d}x = k \int_a^b f(x)\,\mathrm{d}x\,, \qquad k \text{ is a constant}$$</td><td>$$\int k\, f(x)\,\mathrm{d}x = k \int f(x)\,\mathrm{d}x\,, \qquad k \text{ is a constant}$$</td></tr>
<tr><td>
</td><td>$$\int_a^b x^n\,\mathrm{d}x = \frac{b^{n+1}}{n+1} - \frac{a^{n+1}}{n+1}, \qquad n \neq -1$$</td><td>$$\int x^n\,\mathrm{d}x = \frac{x^{n+1}}{n+1} + C, \qquad n \neq -1$$</td></tr>
</table>

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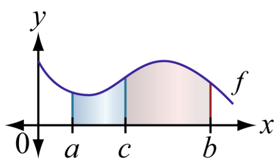
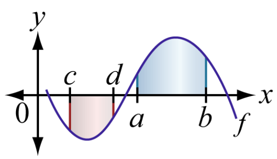
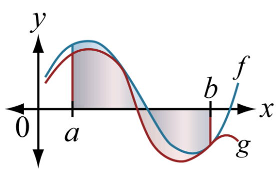
Example	Property for definite integrals	Property for antiderivatives
	$\int_a^c f(x)\,\mathrm{d}x + \int_c^b f(x)\,\mathrm{d}x = \int_a^b f(x)\,\mathrm{d}x$	
	If $a < b$ and $f(x) \geq 0$ on $[a, b]$, then $\int_a^b f(x)\,\mathrm{d}x \geq 0$	
	If $a < b$ and $f(x) \geq g(x)$ on $[a, b]$, then $\int_a^b f(x)\,\mathrm{d}x \geq \int_a^b g(x)\,\mathrm{d}x$	

Excerpted from Stewart 4th ed.