

Fundamentos de Cálculo Aplicado

Fundamentos gerais sobre
cálculo diferencial e
integral

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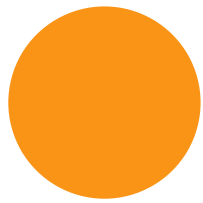
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Calculando integrais

The image shows a chalkboard with handwritten mathematical work. The top line shows the integral of $x^2 \sqrt{x} + \frac{x}{2} - x^4 \frac{x^4}{2}$ with respect to x . The second line shows the result of the integration: $\frac{2}{7} x^{\frac{7}{2}} + \frac{x^2}{4} - \frac{3}{10} x^5$, evaluated from 0 to 2. The third line shows the final result: $\frac{33}{140}$. The bottom right shows the integrand $(x^2 + y) dx dy$ and the limits of integration $\cos(x+y)$ and $\sin(x+y)$.

$$\int (x^2 \sqrt{x} + \frac{x}{2} - x^4 \frac{x^4}{2}) dx$$
$$= \left(\frac{2}{7} x^{\frac{7}{2}} + \frac{x^2}{4} - \frac{3}{10} x^5 \right) \Big|_0^2 = \frac{33}{140}$$

$(x^2 + y) dx dy$
 $\cos(x+y)$
 $\sin(x+y)$

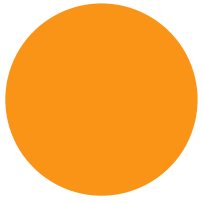


Mudança de variáveis ou substituição

Definimos uma nova variável relacionada com a variável por meio da expressão:

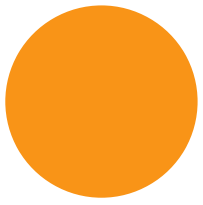
Usaremos o seguinte:





Exemplo:



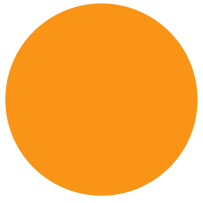


Integração por partes

Na integração por partes, podemos lidar com integrais de produtos de funções, do tipo:

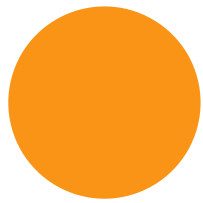
A regra de integração por partes diz que dadas duas funções deriváveis u e v , então:



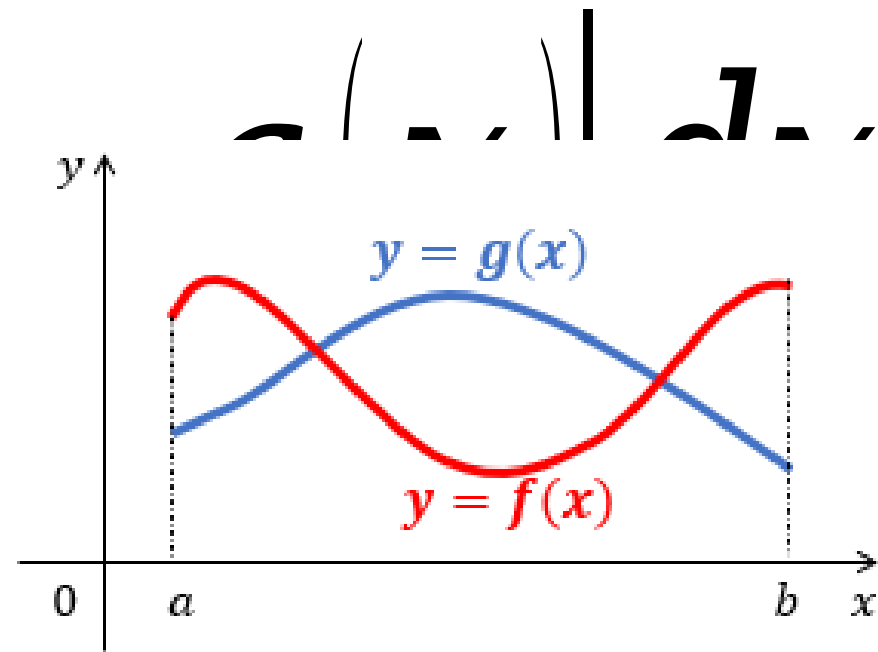
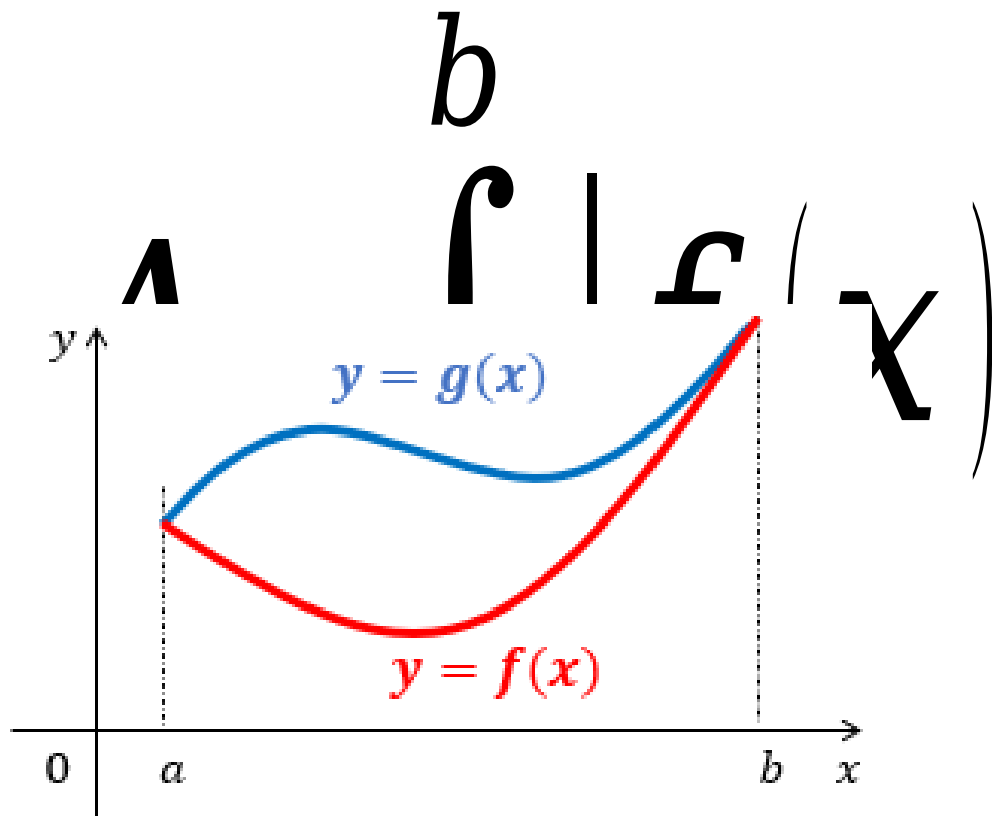


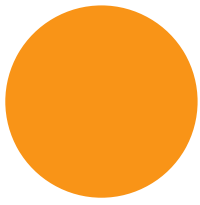
Exemplo:



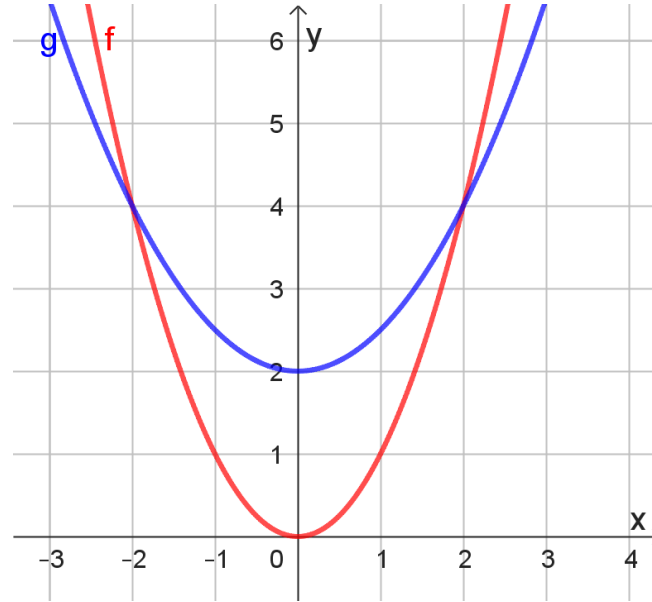


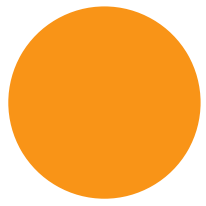
Área entre curvas





Exemplo:





Outras aplicações

Volume de sólidos de revolução:

Trabalho:

