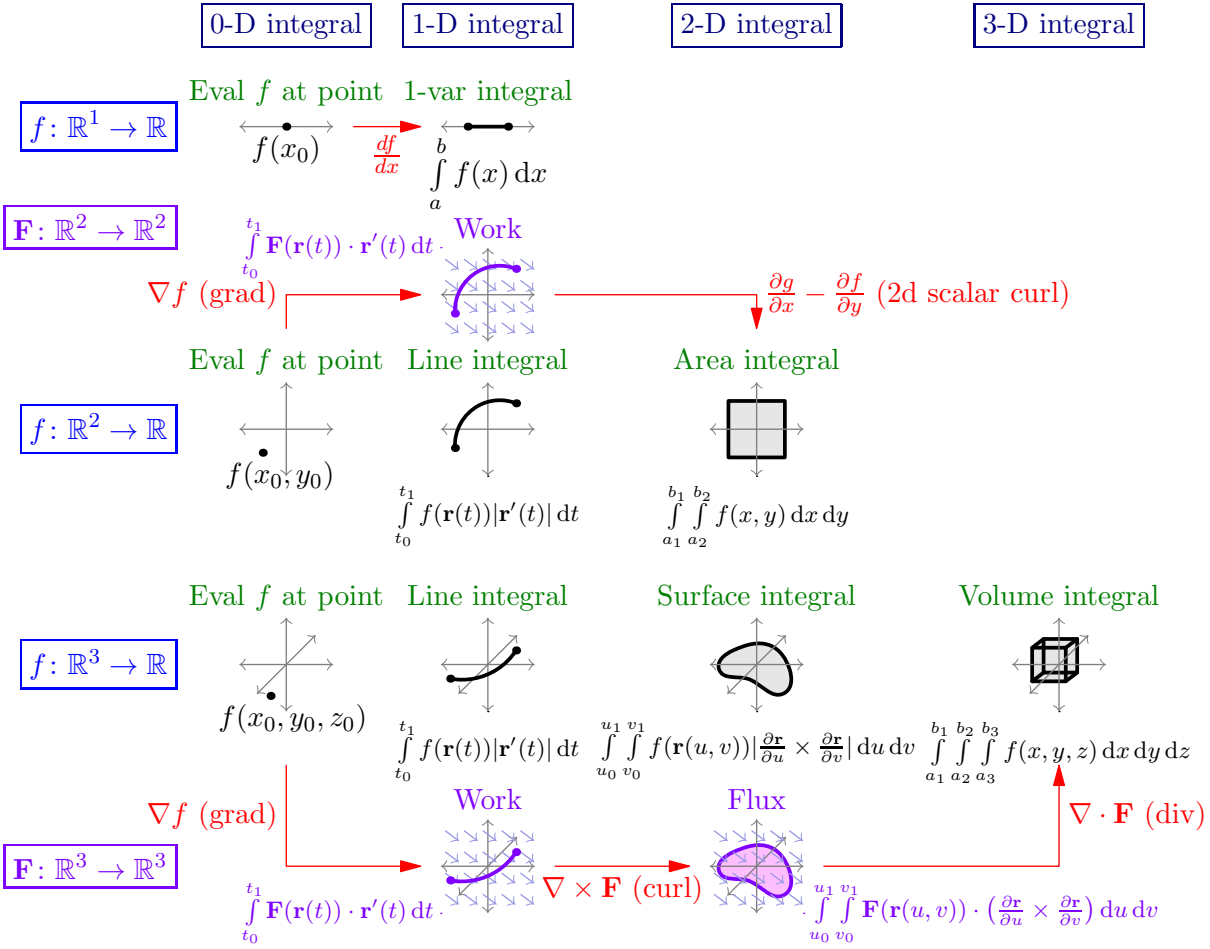
0-D integral
1-D integral
2-D integral
3-D integral
Eval f at point
1-var integral
$f\colon \mathbb{R}^1 \to \mathbb{R}$
$f(x_0)$
$\frac{df}{dx}$
$\int_a^b f(x)\,\mathrm{d}x$
$\mathbf{F}\colon \mathbb{R}^2 \to \mathbb{R}^2$
$\int_{t_0}^{t_1} \mathbf{F}(\mathbf{r}(t)) \cdot \mathbf{r}'(t)\,\mathrm{d}t$
Work
∇f (grad)
$\frac{\partial g}{\partial x} - \frac{\partial f}{\partial y}$ (2d scalar curl)
Eval f at point
Line integral
Area integral
$f\colon \mathbb{R}^2 \to \mathbb{R}$
$f(x_0, y_0)$
$\int_{t_0}^{t_1} f(\mathbf{r}(t))|\mathbf{r}'(t)|\,\mathrm{d}t$
$\int_{a_1}^{b_1}\int_{a_2}^{b_2} f(x,y)\,\mathrm{d}x\,\mathrm{d}y$
Eval f at point
Line integral
Surface integral
Volume integral
$f\colon \mathbb{R}^3 \to \mathbb{R}$
$f(x_0, y_0, z_0)$
$\int_{t_0}^{t_1} f(\mathbf{r}(t))|\mathbf{r}'(t)|\,\mathrm{d}t$
$\int_{u_0}^{u_1}\int_{v_0}^{v_1} f(\mathbf{r}(u,v))\left|\frac{\partial \mathbf{r}}{\partial u} \times \frac{\partial \mathbf{r}}{\partial v}\right|\mathrm{d}u\,\mathrm{d}v$
$\int_{a_1}^{b_1}\int_{a_2}^{b_2}\int_{a_3}^{b_3} f(x,y,z)\,\mathrm{d}x\,\mathrm{d}y\,\mathrm{d}z$
∇f (grad)
Work
Flux
$\nabla \cdot \mathbf{F}$ (div)
$\mathbf{F}\colon \mathbb{R}^3 \to \mathbb{R}^3$
$\int_{t_0}^{t_1} \mathbf{F}(\mathbf{r}(t)) \cdot \mathbf{r}'(t)\,\mathrm{d}t$
$\nabla \times \mathbf{F}$ (curl)
$\int_{u_0}^{u_1}\int_{v_0}^{v_1} \mathbf{F}(\mathbf{r}(u,v)) \cdot \left(\frac{\partial \mathbf{r}}{\partial u} \times \frac{\partial \mathbf{r}}{\partial v}\right)\mathrm{d}u\,\mathrm{d}v$