

Parametrisering af område mellem 2 funktioner

```
> restart
```

```
> with(plots) :
```

```
> f := x → x2
```

$$f := x \rightarrow x^2$$

(1)

```
> g := x → 3 - x
```

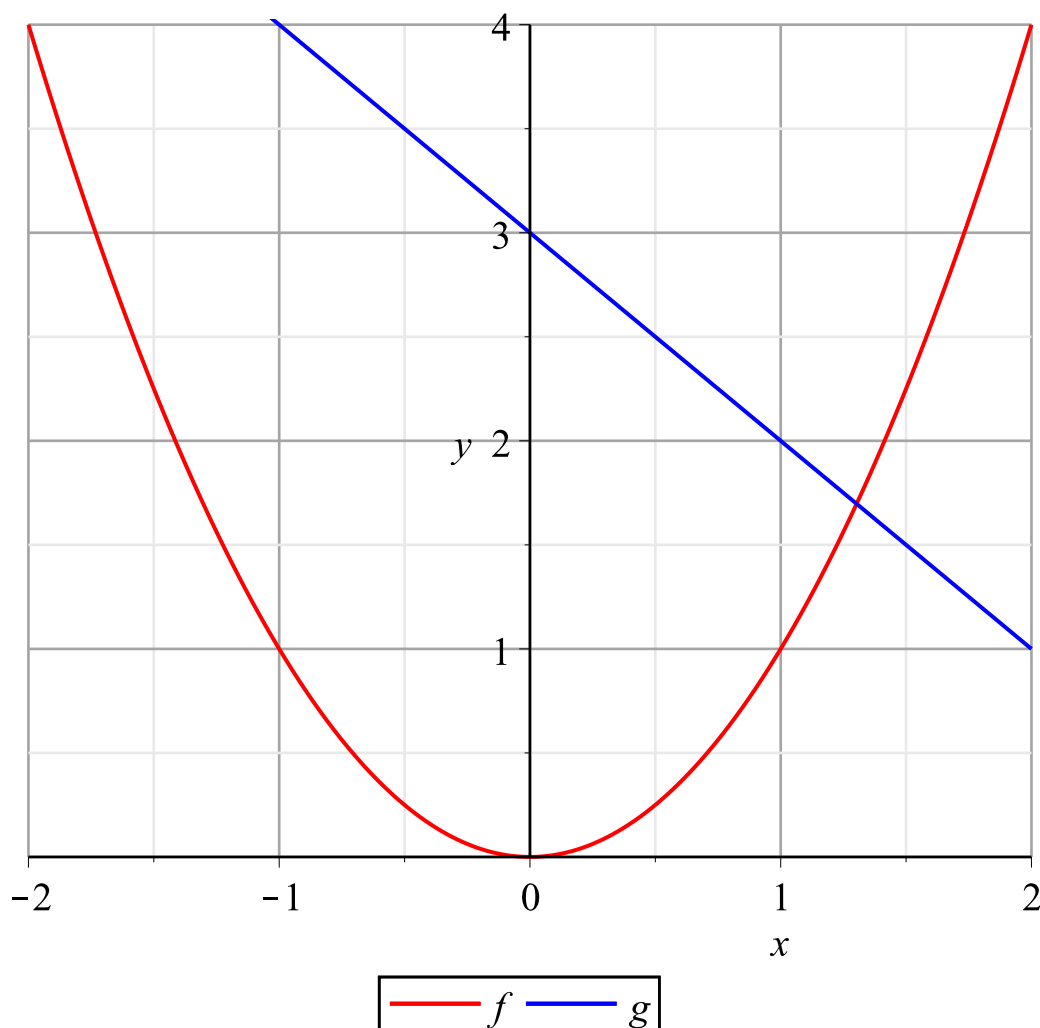
$$g := x \rightarrow 3 - x$$

(2)

```
> GrafF := plot(f(x), x = -2 .. 2, y = 0 .. 4, gridlines, color = red, legend = f) :
```

```
GrafG := plot(g(x), x = -2 .. 2, y = 0 .. 4, gridlines, color = blue, legend = g) :
```

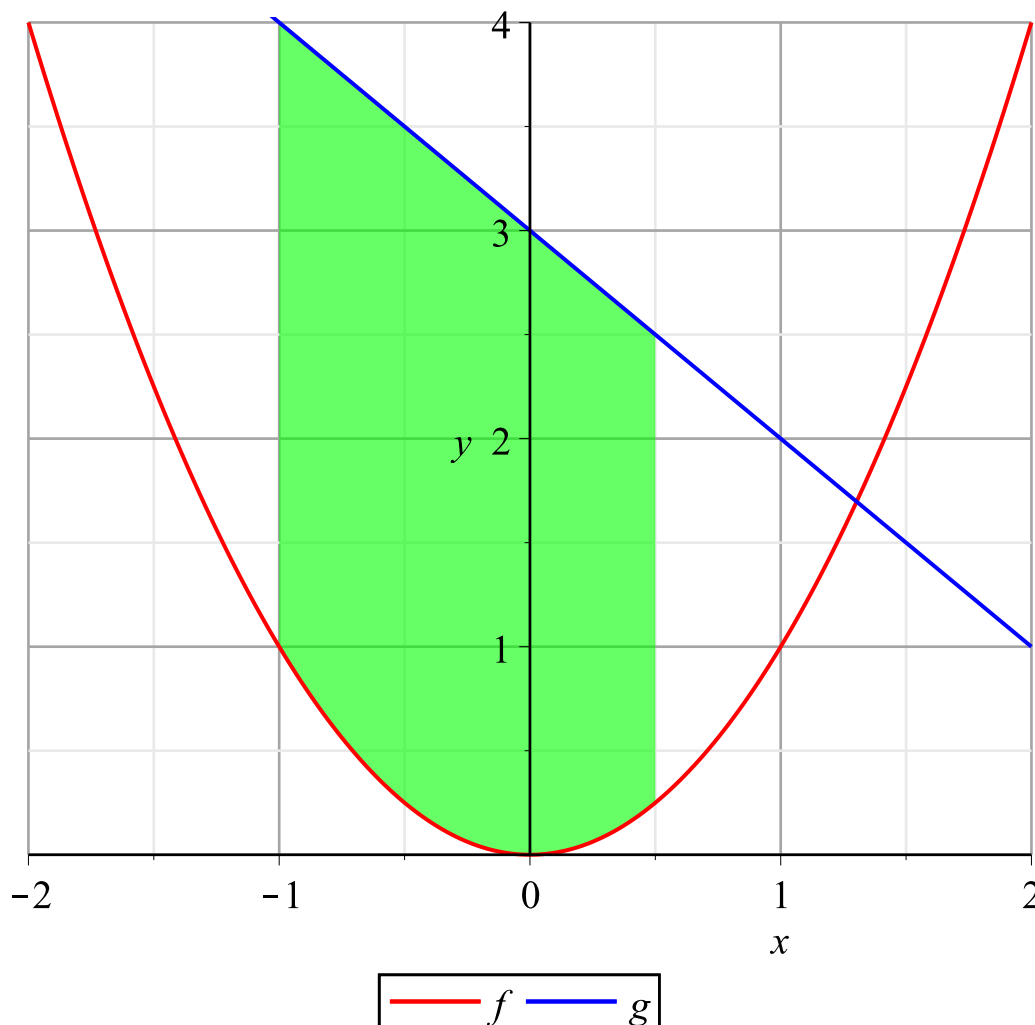
```
display(GrafF, GrafG)
```



Ønsker at parametrisere området mellem funktioner for $x \in \left[-1; \frac{1}{2}\right]$:

```
> Område := shadebetween(f(x), g(x), x = -1 .. 1/2, color = green, showboundary = false) :
```

```
display(GrafF, GrafG, Område)
```



Generel formel:

Parametrisering af området mellem $f(x)$ og $g(x)$ for x fra a til b

$r(u, v) = (u, f(u) + v \cdot (g(u) - f(u)))$ for $u \in [a; b]$ og $v \in [0; 1]$

Når $v = 0$ befinder man sig i $f(u)$, dvs. $f(x)$

Når $v = 1$ befinder man sig i $f(u) + 1 \cdot (g(u) - f(u)) = g(u)$, dvs. $g(x)$

Tjek:

$r := (u, v) \rightarrow \langle u, f(u) + v \cdot (g(u) - f(u)) \rangle :$
 $'r(u, v)' = r(u, v)$

$$r(u, v) = \begin{bmatrix} u \\ u^2 + v(-u^2 - u + 3) \end{bmatrix} \tag{3}$$

$\rightarrow \text{plot3d}(\langle r(u, v)[1], r(u, v)[2], 0 \rangle, u = -1 .. \frac{1}{2}, v = 0 .. 1, \text{labels} = [x, y, " "], \text{axes} = \text{normal}, \text{orientation} = [-90, 0], \text{view} = [-2 .. 2, 0 .. 4, -1 .. 1])$

