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local symcomp = require "symcomp"
function basic(t) return t[1] end
function latex(t) return t[2] end
f = symcomp.expression("-1/2*x^2") g = symcomp.expression("x + 4")
result = symcomp.derivate(basic(f), "x")

```

1. (k points) How big is the parabolic segment between the parabola  $f(x) = \text{tex.print}(\text{latex}(f))$  and the line  $g(x) = \text{tex.print}(\text{latex}(g))$ ?

Sketch a graph to visualize the desired area.

**Solution:** The graphs of the functions  $f$  and  $g$  have intersection points at  $P_1(-2, 2)^T$  and  $P_2(4, 8)^T$ . Thus, the area is

$$A = \int_{-2}^4 (g(x) - f(x)) \, dx = \int_{-2}^4 \left( x + 4 - \frac{1}{2}x^2 \right) \, dx = \left[ x + 4 - \frac{1}{2}x^2 \right]_{-2}^4 = 18.$$

