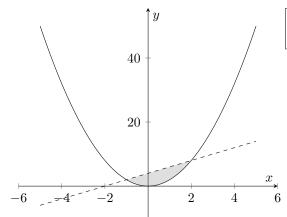
1. (k points) How big is the parabolic segment between the parabola  $f(x) = 2x^2$  and the line g(x) = 4 + 2x?

Sketch a graph to visualize the desired area.

**Solution:** The functions intersect at  $P_1(-1,2)^T$  and at  $P_2(2,8)^T$ . Thus, the area is

$$A = \int_{-1}^{2} g(x) - f(x) dx = \int_{-1}^{2} 4 + 2x - 2x^{2} dx = \left[ \frac{1}{3} x (12 + 3x - 2x^{2}) \right]_{-1}^{2} = 2(-4 + 3x^{2} - x^{3})$$



$$f(x) = 2x^2$$

$$--- g(x) = 4 + 2x$$