

1. (5 points) Evaluate the definite integral below. (The number  $a$  is a constant.)

$$\int_0^a (a^2x - x^3) dx$$

**Solution:** Since  $a$  is a constant, the simplest antiderivative for the integrand is  $a^2x^2/2 - x^4/4$ , and thus we have

$$\int_0^a (a^2x - x^3) dx = \left[ \frac{a^2x^2}{2} - \frac{x^4}{4} \right]_0^a = \frac{a^4}{2} - \frac{a^4}{4} = \frac{a^4}{4}.$$