

## NCEA Level 3 Calculus (Integration)

### 17. The Fundamental Theorem of Calculus (Homework)

#### Reading

This is an explanation with visualisations of why the FTC is true (but is not a proof); it follows the same kind of reasoning that I use in the calculus notes: <https://www.youtube.com/watch?v=FnJqaIESC2s>.

#### Questions

1. Evaluate

$$\int_0^{\frac{\pi}{4}} \sec^2 \theta \, d\theta$$

2. If  $\int_1^3 f(x) \, dx = 7$  and  $\int_2^3 f(x) \, dx = -3$ , what is the value of  $\int_1^2 f(x) \, dx$ ?
3. Find the area enclosed between the graphs of  $3y = x^2$  and  $y = 2x$ .