

## Part 4

# Linearization

**Question 4.1.** Find the linear approximation of  $f(x) = \sqrt{x^2 + 9}$  at  $a = -4$ .

**Question 4.2.** Use linear approximation to estimate the cube root of 1006.

**Question 4.3.** Find the linear approximation of  $f(x) = \sqrt{x+1} + \sin x$  at  $a = 0$ , and use it to estimate  $\sqrt{1.004} + \sin(0.004)$ .