# 3 Gradient of a Secant

1. Distinguish between a tangent and a secant. Also, explain why a secant line can be used to approximate the gradient of a curve.

2. On a Cartesian plane, draw the graph of $y = \frac{1}{2}x^2$.

   a. Draw a tangent line at $x = 2$.

   b. Draw a secant line P intersecting the graph at $x = 2$ and $x = 4$. Approximate the gradient at $x = 2$ by calculating the gradient of the secant line.

   c. Draw a secant line Q intersecting the graph at $x = 2$ and $x = 3$. Approximate the gradient at $x = 2$ by calculating the gradient of the secant line.

   d. What do you notice about the gradients of both of these secant lines?

3. On a Cartesian plane, draw the graph of $y = x^3$.

   a. Draw a tangent line at $x = 1$.

   b. Draw a secant line J intersecting the graph at $x = 1$ and $x = 3$. Approximate the gradient at $x = 1$ by calculating the gradient of the secant line.

   c. Draw a secant line K intersecting the graph at $x = 1$ and $x = 2$. Approximate the gradient at $x = 1$ by calculating the gradient of the secant line.

   d. What do you notice about the gradients of both of these secant lines?