

3. On separate diagrams, sketch the graphs of

(a) $y = (x + 3)^2$,

(3)

(b) $y = (x + 3)^2 + k$, where k is a positive constant.

(2)

Show on each sketch the coordinates of each point at which the graph meets the axes.



4. A sequence a_1, a_2, a_3, \dots is defined by

$$a_1 = 3,$$
$$a_{n+1} = 3a_n - 5, \quad n \geq 1.$$

(a) Find the value of a_2 and the value of a_3 . (2)

(b) Calculate the value of $\sum_{r=1}^5 a_r$. (3)



10. The curve C with equation $y = f(x)$, $x \neq 0$, passes through the point $(3, 7\frac{1}{2})$.

Given that $f'(x) = 2x + \frac{3}{x^2}$,

(a) find $f(x)$. **(5)**

(b) Verify that $f(-2) = 5$. **(1)**

(c) Find an equation for the tangent to C at the point $(-2, 5)$, giving your answer in the form $ax + by + c = 0$, where a , b and c are integers. **(4)**



