blank

1. Find, in simplest form,

$$\int \left(\frac{8x^3}{3} - \frac{1}{2\sqrt{x}} - 5 \right) \mathrm{d}x$$

(4)

7 **(a)** Write down the first four terms of the expansion, in ascending powers of x, of $(a - x)^6$. [2]

10.

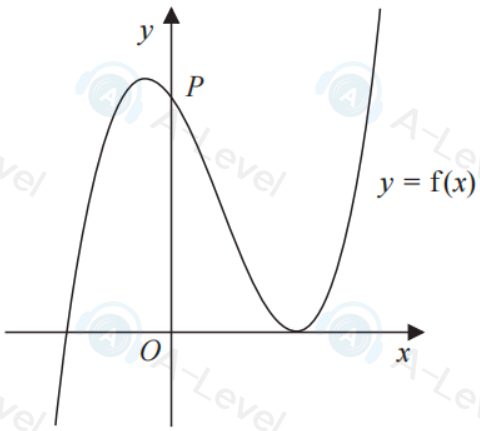

Figure 6

Figure 6 shows a sketch of part of the curve with equation $y = \mathrm{f}(x)$, where

$$\mathrm{f}(x) = (2x + 5)(x - 3)^2$$

(a) Deduce the values of x for which $\mathrm{f}(x) \leqslant 0$

(2)

The curve crosses the y-axis at the point P, as shown.

(b) Expand $\mathrm{f}(x)$ to the form

$$ax^3 + bx^2 + cx + d$$

where a, b, c and d are integers to be found.

(3)

(c) Hence, or otherwise, find

(i) the coordinates of P,

(ii) the gradient of the curve at P.

(2)

The curve with equation $y = \mathrm{f}(x)$ is translated two units in the positive x direction to a curve with equation $y = \mathrm{g}(x)$.

(d) (i) Find $\mathrm{g}(x)$, giving your answer in a simplified factorised form.

(ii) Hence state the y intercept of the curve with equation $y = \mathrm{g}(x)$.

(3)

7. The curve C has equation $y = f(x)$ where

$$f(x) = 2x^3 - kx^2 + 14x + 24$$

and k is a constant.

(a) Find, in simplest form,

(i) $f'(x)$

(ii) $f''(x)$

(3)

The curve with equation $y = f'(x)$ intersects the curve with equation $y = f''(x)$ at the points A and B.

Given that the x coordinate of A is 5

(b) find the value of k.

(2)

(c) Hence find the coordinates of B.

(3)