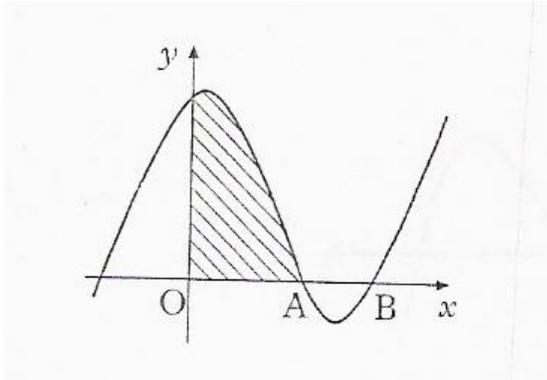




1. $\int_4^9 (x - \sqrt{x}) dx$

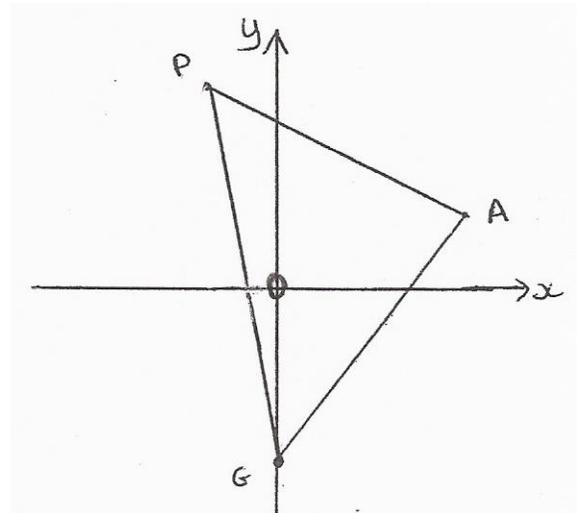
2. The diagram shows a sketch of the graph of $y = x^3 - 4x^2 + x + 6$.



- (a) Show that the graph cuts the x-axis at (3,0).
- (b) Hence or otherwise find the coordinates of A.
- (c) Find the shaded area.

3. Triangle PAG has vertices P(-4,10), A(10,3) and G(0, -10) as shown.

- (a) Find the equation of the median AM.
- (b) Find the equation of the altitude GT.
- (c) Find the point of intersection of the median AM and the altitude GT.

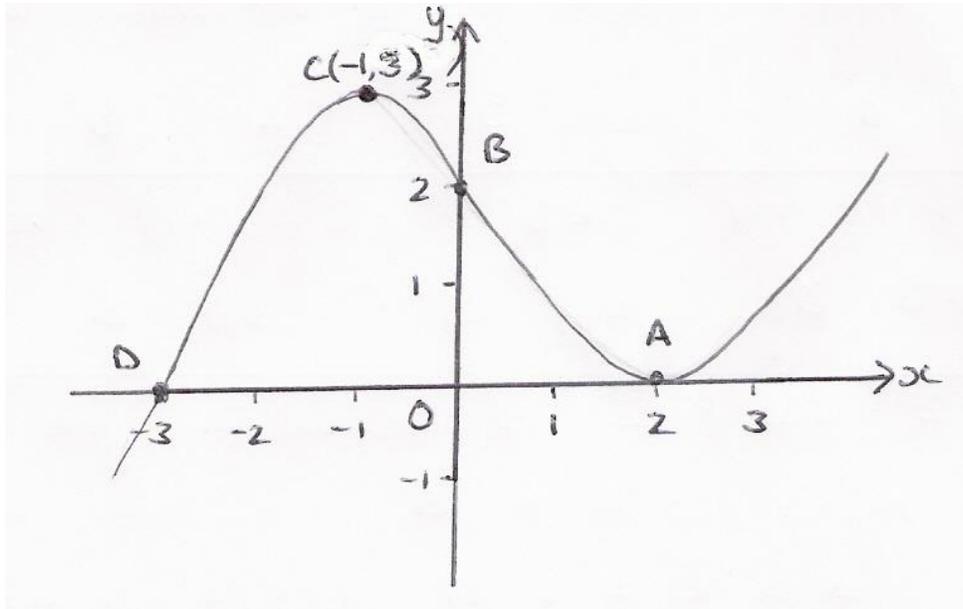


4. A sequence is defined by the recurrence relation $u_n = 0.9u_{n-1} + 2$, $u_1 = 3$.

- (a) Calculate the value of u_2 .
- (b) What is the smallest value of n for which $u_n > 10$?
- (c) Find the limit of this sequence as $n \rightarrow \infty$.

5. If $f(x) = \frac{x+1}{2x^2}$ find $f'(x)$.

6. Part of the graph of $y = f(x)$ is shown in the diagram below.



On separate diagrams sketch the graphs of:

(a) $y = f(x - 1)$

(b) $y = -f(x) - 2$

indicating on each graph the images of A, B, C and D.

7. (a) $f(x) = 2x + 1$, $g(x) = x^2 + k$, where k is a constant.

(i) Find $g(f(x))$.

(ii) Find $f(g(x))$.

(b) (i) Show that the equation $g(f(x)) - f(g(x)) = 0$ simplifies to $2x^2 + 4x - k = 0$.

(ii) Determine the nature of the roots of this equation when $k = 6$.

(iii) Find the value of k for which $2x^2 + 4x - k = 0$ has equal roots.

8. If $\log_6 y = 2\log_6 x + \log_6 12$ express y in terms of x .

9. As shown in the diagram below, a set of experimental results gives a straight line graph when $\log_{10} y$ is plotted against $\log_{10} x$.

The straight line passes through $(0, 1)$ and has a gradient of 2.

Express y in terms of x .

