1. **[ACS(I) 15 (modified)]**
   (a) Solve $2 + \ln(4 - x) = 0$. [2]
   (b) Sketch the graph of $y = 2 + \ln(4 - x)$, showing clearly the asymptote and the y-intercept. [3]

2. (a) Sketch the graph of $y = 4 - e^{x-2}$, showing clearly the asymptote and the x- and y-intercepts. [3]
   (b) Find the area of the region bounded by the curve $y = 4 - e^{x-2}$, the line $y = 3$, the x-axis and the y-axis. [5]

3. **[ACS(I) 15]**
   Variables x and y are related by the equation $y = \dfrac{p - x}{x + q}$, where p and q are constants. When the graph of $x(1 + y)$ against y is drawn, a straight line is obtained. The line has a gradient of $(-1\frac{1}{3})$ and passes through the point $(3, 2)$.
   (a) Calculate the value of p and of q. [4]
   (b) Given that the line passes through $(6, k)$, find x in terms of k. [2]

4. **[Anderson 15 (modified)]**
   A curve is defined by $(1 - 2x)^2 e^{2x}$.
   (a) The equation, in terms of e, of the tangent at the point where $x = 1$. [6]
   (b) Find the x-coordinate(s) of the stationary point(s) on the curve and determine the nature of the point(s). [4]

Answers

1. (a) $x = 3.86$.
2. (b) 8.55 units^2.
3. (a) $p = 6, q = \frac{4}{3}$.
   (b) $x = \frac{k}{7}$.
4. (a) $y = 6e^2x - 5e^2$.
   (b) $x = -\frac{1}{2}$ (max), $x = \frac{1}{2}$ (min).