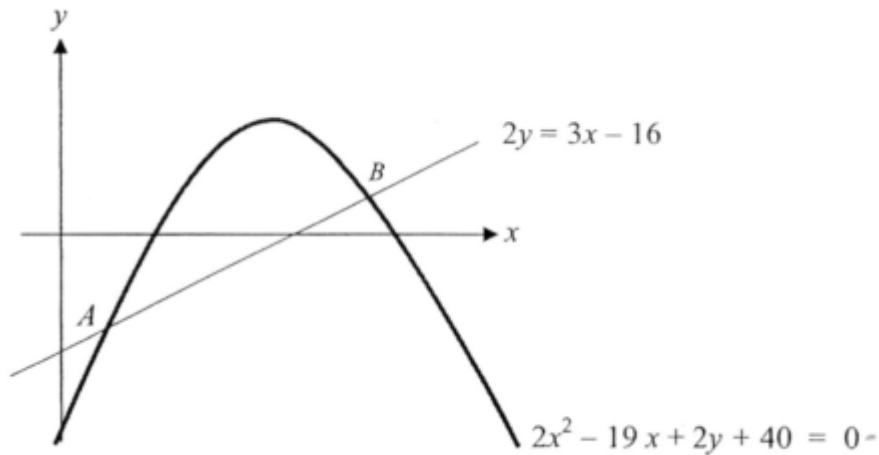


1. [CHS 15 (modified)]



The straight line $2y = 3x - 16$ intersects the curve $2x^2 - 19x + 2y + 40 = 0$ at the points A and B , as shown on the diagram above.

Find the area bounded by the line and the curve.

[7]

2. [CHIC SJCS 15 (modified)]

A curve has the equation $y = (x - 2)(x + 1)^3$.

(a) Find the x -coordinates of the starting points.

[4]

(b) Determine the nature of the stationary points.

[4]

3. [Swiss cottage 15 (modified)]

Variables x and y are connected by the equation $y = 10^{k-nx}$, where n and k are constants. When a graph of $\lg y$ is plotted against x , a straight line passing through the points $(1, 2)$ and $(4, -7)$ is obtained. Find the value of n and of k .

4. [TKSS 15 (modified)]

A bowl of hot soup was left to cool such that t minutes later, its temperature, $H^\circ\text{C}$, is given by $H = 25 + 70e^{-kt}$, where k is a constant.

When $t = 2$, the temperature of the soup is 80°C .

(a) Show that $k = 0.1206$.

[2]

(b) Find the time taken for the soup to reach 40°C .

[2]

(c) Sketch the graph of H against t .

[3]

Answers

1. $\frac{32}{3}$.
2. (a) $x = -1$ or $x = \frac{5}{4}$.
(b) Stationary point of inflexion and minimum point respectively.
3. $n = 3, k = 5$.
4. $t = 12.8$ min.