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**3.** $f(x) = 6x^3 + 17x^2 + 4x - 12$

(a) Use the factor theorem to show that $(2x + 3)$ is a factor of $f(x)$.

**(2)**

(b) Hence, using algebra, write $f(x)$ as a product of three linear factors.

**(4)**

(c) Solve, for $\frac{\pi}{2} < \theta < \pi$, the equation

$$6\tan^3\theta + 17\tan^2\theta + 4\tan\theta - 12 = 0$$

giving your answers to 3 significant figures.

**(2)**

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**Question 3 continued**

**Q3**

**(Total 8 marks)**

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**4.**

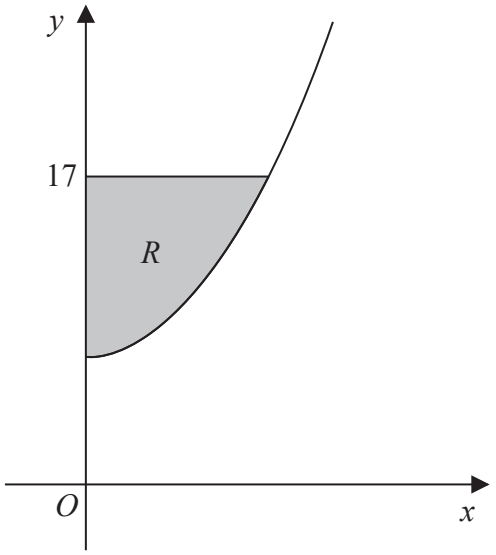



**Figure 1**

Figure 1 shows a sketch of the curve with equation

$$y = 2x^2 + 7 \qquad x \geqslant 0$$

The finite region $R$, shown shaded in Figure 1, is bounded by the curve, the $y$-axis and the line with equation $y = 17$

Find the exact area of $R$.

**(6)**

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