7 The curve C has equation $y = \dfrac{x+2}{x^2+3x+1}$.

(a) Find the equations of the asymptotes of C. [2]

(b) Show that C has no stationary points. [3]

(c) Sketch C, stating the coordinates of the intersections with the axes. [3]

(d) Sketch the curve with equation $y = \left|\dfrac{x+2}{x^2+3x+1}\right|$. [2]

(e) Find in exact form the set of values of x for which $\left|\frac{x+2}{x^2+3x+1}\right| > 2$. [4]

Additional page

If you use the following page to complete the answer to any question, the question number must be clearly shown.

7 The curve C has equation $y = \frac{x^2+x+1}{x+1}$.

(a) Find the equations of the asymptotes of C. [3]

(b) Find the coordinates of any stationary points on C. [3]

(c) Sketch C. [3]

(d) Sketch the curve with equation $y = \frac{|x|^2+|x|+1}{|x|+1}$. [2]

(e) Find, in exact form, the set of values of x for which $\frac{|x|^2+|x|+1}{|x|+1} < 3$. [3]

Additional page

If you use the following page to complete the answer to any question, the question number must be clearly shown.

7 The curve C has equation $y = \frac{10x^2 - 11x - 18}{10x - 18}$.

(a) Find the equations of the asymptotes of C. [3]

(b) Show that C has no stationary points. [4]

(c) Sketch C, stating the coordinates of the points of intersection with the axes. [3]

(d) Sketch the curve with equation $y = \left|\frac{10x^2 - 11x - 18}{10x - 18}\right|$. [2]

(e) Given that $\left|\frac{10x^2-11x-18}{10x-18}\right| < 4$ for $\frac{-29-\sqrt{4441}}{20} < x < p$ and $\frac{-29+\sqrt{4441}}{20} < x < q$, find the values of p and q. [4]

Additional page

If you use the following page to complete the answer to any question, the question number must be clearly shown.

7 The curve C has equation $y = \dfrac{2x^2 - 5x}{2x^2 - 7x - 4}$.

(a) Find the equations of the asymptotes of C. [2]

(b) Find the coordinates of any stationary points on C. [4]

(c) Sketch C, stating the coordinates of the intersections with the axes. [3]

(d) Sketch the curve with equation $y = \left|\dfrac{2x^2 - 5x}{2x^2 - 7x - 4}\right|$. [1]

(e) Find in exact form the set of values of x for which $\left|\frac{2x^2-5x}{2x^2-7x-4}\right| < \frac{1}{9}$. [5]

Additional page

If you use the following lined page to complete the answer(s) to any question(s), the question number(s) must be clearly shown.

6 The curve C has equation $y = \frac{x^2 + a}{x + a}$, where a is a positive constant.

(a) Find the equations of the asymptotes of C. [3]

(b) Find, in terms of a, the x-coordinates of the stationary points on C. [3]

(c) Sketch C, stating the coordinates of any intersections with the axes. [3]

(d) Sketch the curve with equation $y = \left|\frac{x^2 + a}{x + a}\right|$. [1]

(e) Find the set of values of a for which $\left|\frac{x^2+a}{x+a}\right| = a$ has two real solutions. [4]