

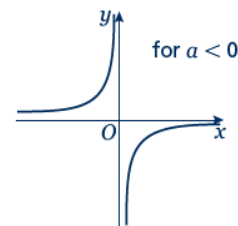
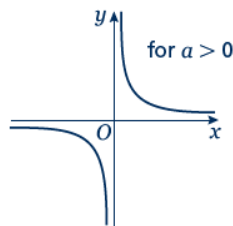
# Sketching reciprocal graphs

## A LEVEL LINKS

Scheme of work: 1e. Graphs – cubic, quartic and reciprocal

## Key points

- The graph of a reciprocal function of the form  $y = \frac{a}{x}$  has one of the shapes shown here.



- To sketch the graph of a function, find the points where the graph intersects the axes.
- To find where the curve intersects the  $y$ -axis substitute  $x = 0$  into the function.
- To find where the curve intersects the  $x$ -axis substitute  $y = 0$  into the function.
- Where appropriate, mark and label the asymptotes on the graph.
- Asymptotes are lines (usually horizontal or vertical) which the curve gets closer to but never touches or crosses. Asymptotes usually occur with reciprocal functions. For example, the asymptotes for the graph of  $y = \frac{a}{x}$  are the two axes (the lines  $y = 0$  and  $x = 0$ ).
- At the turning points of a graph the gradient of the curve is 0 and any tangents to the curve at these points are horizontal.
- A double root is when two of the solutions are equal. For example  $(x - 3)^2(x + 2)$  has a double root at  $x = 3$ .
- When there is a double root, this is one of the turning points of a cubic function.

## Practice questions

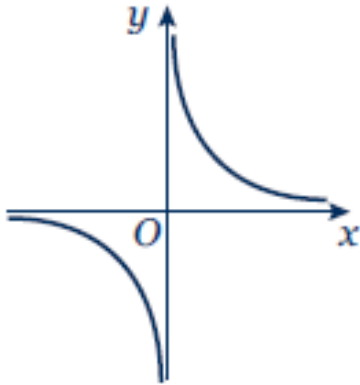
1  $y = \frac{3}{x}$

2  $y = -\frac{2}{x}$

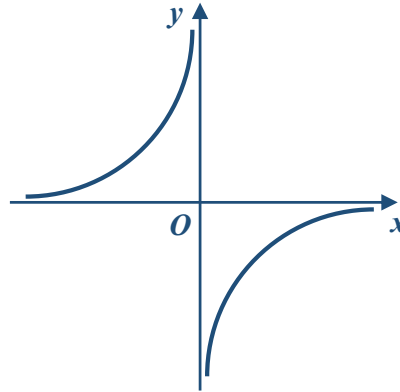
3 Sketch on the same diagram  $y = \frac{5}{x^2}$  and  $y = \frac{8}{x^2}$

## Answers

1



2



3

