


# Edexcel AS Mathematics Graphs and transformations

## Section 1: Sketching graphs of functions

### Exercise level 2

Do not use a graphical calculator or graphing software for this exercise.

- On the same axes, sketch the graphs of  $y = x(x-1)(x-3)$  and  $y = x(x+2)(x-2)$ .
  - Find the coordinates of the points of intersection of the curves.
- On the same axes, sketch the graphs of  $y = \frac{1}{x}$  and  $y = 2x+1$ .
  - Find the coordinates of the points of intersection of the curves.
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  - Find the coordinates of the points of intersection of the graphs of  $y = \frac{4}{x}$  and  $y = 5 - x$ , and illustrate them on a sketch.
  - Show that the graphs of  $y = \frac{4}{x}$  and  $y = 1 - x$  do not intersect, and illustrate this on a sketch.
  - Find the range of values of  $k$  for which the graphs of  $y = \frac{4}{x}$  and  $y = k - x$  do not intersect.
- The force of attraction between two electrically charged particles is inversely proportional to the square of the distance between them. Two particles are separated by 1 cm and the force of attraction between them is 90 N.
  - What is the force of attraction between the same particles when they are 5 cm apart?
  - How far apart must the particles be if the force of attraction between them is to be no more than 2 N?
- When an object moves with constant acceleration starting from rest, its speed is directly proportional to the square root of the distance travelled. When it has travelled 4 metres, its speed is  $10 \text{ ms}^{-1}$ .
  - What is its speed after it has travelled 30 metres?
  - How far has it travelled when its speed reaches  $50 \text{ ms}^{-1}$ ?