

1. Sketch the curves with the following equations and show the points where they cross the coordinate axes
  - a.  $y = (x - 3)(x - 2)(x + 3)$
  - b.  $y = (x - 1)(4 - x)(1 + 2x)$
  - c.  $y = x(2x - 1)(x + 3)$
  - d.  $y = x(x - 3)(2 - x)$
2. Sketch the following curves.
  - a.  $y = (x - 2)^2(2x + 1)$
  - b.  $y = x^3 - 5x^2 + 6x$
  - c.  $y = (2x - 1)(x + 2)^2$
3. Sketch the curves with the equations
  - a.  $y = x^3$  and  $y = -x^2$
  - b.  $y = -x^3$  and  $y = x^2$
  - c.  $y = (x + 2)^3$  and  $y = -(x - 1)^2$
  - d.  $y = (2 - x)^3$  and  $y = (2 - x)^2$
4. Sketch on the same diagram
  - a.  $y = \frac{1}{x}$  and  $y = \frac{1}{2x}$
  - b.  $xy = 3$  and  $xy = 9$
  - c.  $y = -\frac{4}{x}$  and  $y = -\frac{12}{x}$
5. On the same diagram sketch the following curves with the equations of  $y = x^2 - 2x$  and  $y = x^2 - x^3$  and find the coordinates of the points of intersection.
6. On the same diagram sketch the curves with the equations of  $y = x(x - 1)(x + 1)$  and  $y = 4/x$ . Explain how your sketch shows that there are two solutions to the equation  $x(x - 1)(x + 1) - 4/x = 0$
7. Sketch the curves for
  - a.  $g(x) = (x - 3)^2$
  - b.  $h(x) = x^2 + 5$
  - c.  $k(x) = 3x^2 - 1$
  - d.  $l(x) = 3(x - 1)^2$
  - e.  $m(x) = 3(x - 1)^2 + 4$
8. Given that  $f(x) = x^3$ ,  $g(x) = x(x - 3)$  and  $h(x) = 1/x$ 
  - a. sketch the curves with equation  $y = -f(x + 2)$  and  $y = 3g(x + 2)$  and mark the points where the curves cross the axes.
  - b. sketch the curve with equation  $y = 2h(x) - 3$  and state the equations of any asymptotes and intersections with axes
9. Given that  $f(x) = 16 - x^2$ , sketch the curves with equations
  - a.  $y = f(2x)$
  - b.  $y = 2f(x)$
  - c.  $y = 2f(3x)$
  - d.  $y = f(3x) - 4$
  - e.  $y = 2f(x/2) + 1$
  - f.  $y = \frac{1}{2}f(4x) - 2$
10. On the same axes sketch the graphs of  $y = f(x)$ ,  $y = 3f(x)$  and  $y = f(1/4x)$  where
  - a.  $f(x) = (x - 1)^3$
  - b.  $f(x) = -1/2x$
11. The diagram shows a sketch of the  $f(x)$  passing through the origin and points A(1,4) and B(3,1). Sketch the following showing the images of the points O, A, and B
  - a.  $y = f(x + 3)$
  - b.  $y = f(x - 2)$
  - c.  $y = f(x) - 1$
  - d.  $y = 2f(x) + 1$
  - e.  $y = 3f(x - 2)$
  - f.  $y = f(2x) - 1$

