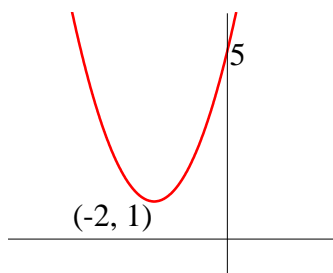# Edexcel AS Mathematics Graphs and transformations

Topic assessment

Do not use a graphical calculator for this test.

1. Sketch the following graphs on separate diagrams.
   (i) $y = x^3$ [1]
   (ii) $y = (x+1)^3$ [2]
   (iii) $y = x^3 - 2$ [2]

2. (i) Sketch the graph $y = \dfrac{1}{x}$. [2]

   (ii) Hence sketch the graph of $y = \dfrac{1}{x+2}$ on a separate diagram. Show the coordinates of any points where the graph cuts the coordinate axes. [3]

   (iii) Write down the equations of the asymptotes of the graph in (ii). [2]

3. (i) Given that $f(x) = (x-2)(x-1)(x+2)$, sketch the graph of $y = f(x)$ and $y = f(x-1)$ on the same axes. [4]

   (ii) Write down the equation of the graph $y = f(x-1)$ in factorised form. [1]

   (iii) Use algebra to find the x-coordinates of the points where the graphs intersect. [4]

4. Given that $g(x) = x^2 - 2x + 4$,
   (i) Find the equation of the curve obtained by translating the curve $y = g(x)$ horizontally 1 unit to the left. [2]

   (ii) Find the equation of the curve obtained by stretching the curve $y = g(x)$ parallel to the y-axis with scale factor 2. [2]

   (iii) Find the equation of the curve obtained by reflecting the curve $y = g(x)$ in the y-axis. [2]

5. The diagram below shows the graph $y = f(x)$, which has a turning point at (-2, 1) and crosses the y-axis at (0, 5).

   Sketch, on separate diagrams, each of the following graphs, showing the coordinates of the turning point and the point at which the graph crosses the y-axis in each case.

   (i) $y = 3f(x)$ [3]
   (ii) $y = f(\tfrac{1}{2}x)$ [3]
   (iii) $y = f(x) + 1$ [3]
   (iv) $y = -f(x)$ [3]

6. (i)   Sketch the graph of $y = f(x)$, where $f(x) = (x+1)^2(2-x)$.
          Show the coordinates of the points where the graph cuts the coordinate
          axes. [3]
    (ii) Hence sketch the graph of $y = f(2x)$, on a separate diagram, showing the
          coordinates of the points where the graph cuts the coordinate axes. [3]
    (iii) Find the equation of the graph $y = f(2x)$ in the form
          $$y = Ax^3 + Bx^2 + Cx + D.$$ [3]

7. Sketch the following graphs for $-360° \le x \le 360°$.
    (i) $y = \cos \frac{1}{2} x$ [3]
    (ii) $y = -3\cos x$ [3]
    (iii) $y = \tan(-x)$ [3]
    (iv) $y = \sin(x + 30°)$ [3]

Total 60 marks