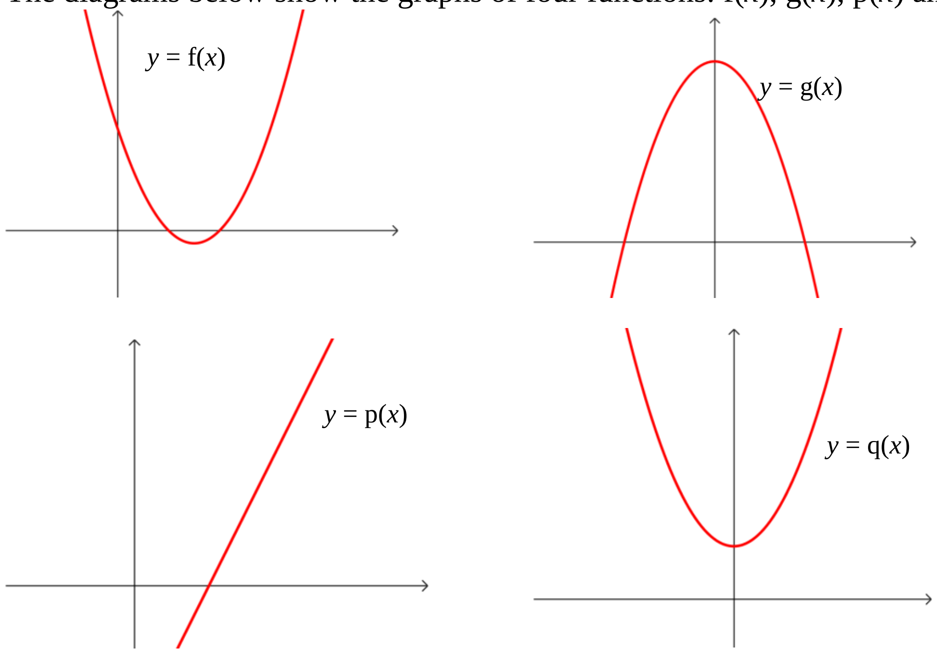
Section 2: Maximum and minimum points

Exercise level 1

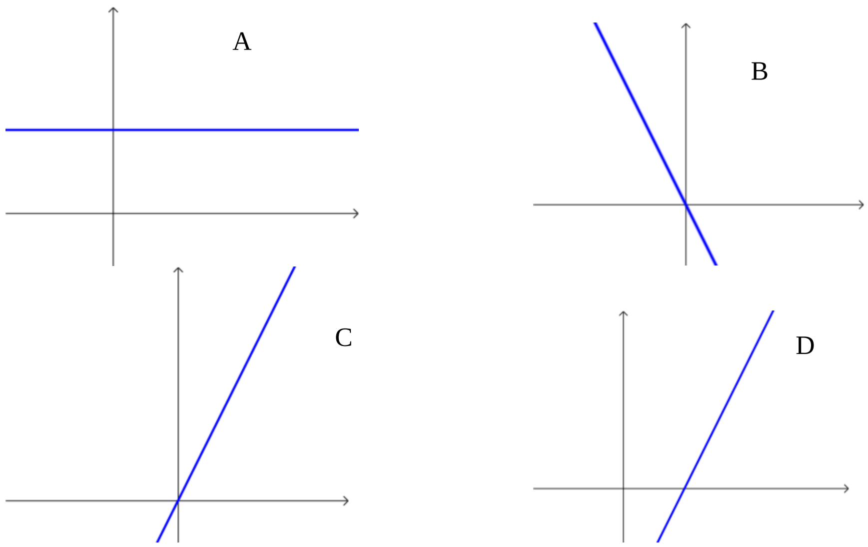
1. Find the range of values of x for which $\mathrm{f}(x) = 2x^2 - 3x + 1$ is an increasing function.

2. Find the range of values of x for which $\mathrm{f}(x) = 4 + 7x - 3x^2$ is a decreasing function.

3. The diagrams below show the graphs of four functions: f(x), g(x), p(x) and q(x).



The diagrams below show the gradient functions of f(x), g(x), p(x) and q(x).
Match the diagrams A, B, C and D to the equations $y = \mathrm{f}'(x)$, $y = \mathrm{g}'(x)$, $y = \mathrm{p}'(x)$ and $y = \mathrm{q}'(x)$.



AS Maths Differentiation 2 Exercise

4. A curve has equation $y = x^3 + 6x^2 + 9x$.

   (i) Differentiate the function to obtain $\frac{dy}{dx}$.

   (ii) Find the x coordinates of the points where $\frac{dy}{dx} = 0$ and hence the coordinates of the turning points on the curve.

   (iii) By considering the sign of $\frac{dy}{dx}$ on either side of the turning points, determine whether the turning points are maximum or minimum points.

   (iv) Sketch the curve showing the turning points and points of intersection with the axes clearly.