Stationary Points

Starter

1. **(Review of last lesson)** A curve has equation $y = x^3 - px + q$. The tangent to this curve at the point $(2, -8)$ is parallel to the $x-$axis.
   (a) Find the values of p and q.
   (b) Find the coordinates of the other point where the tangent is parallel to the $x-$axis.

N.B. A ***stationary point*** is where the ***gradient is zero***.

2. Find the stationary points of the curve $y = x^3 - 15x^2 + 48x + 7$.

Notes

Success Criteria — finding stationary points

1. Differentiate to find the derivative.
2. Put the derivative equal to zero.
3. Solve for x.
4. Substitute the $x-$value into the original equation to get the $y-$coordinate.

E.g. 1 Find the stationary point(s) of the curve $y = \dfrac{x^2 + 9}{2x}$.

E.g. 2 The curve $y = 3x^4 + ax^3 + bx^2$ passes through the point $(1, 3)$ and has a stationary point when $x = 2$. Find a and b.

Video: Stationary points

Solutions to Starter and E.g.s

Exercise

p279 14B Qu 1 (just find the stationary points)

Summary

Finding stationary points:

1. Differentiate to find the derivative.
2. Put the derivative equal to zero.
3. Solve for x.
4. Substitute the $x-$value into the original equation to get the $y-$coordinate.