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S4S coaching

Year 12- Mathematics Advanced

Geometrical applications of Differentiation

Geometrical Applications of Differentiation Exam
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1.   (**2 marks**)
   Find the primitive function of $y' = 2 + \sqrt{x}$

2.   (**3 marks**)
   The second derivative of a function is y"=$3x^2 - 2x + 1$, at x=1, the corresponding y-value is 0 and the first derivative is equal to 1. Find the equation of the function.
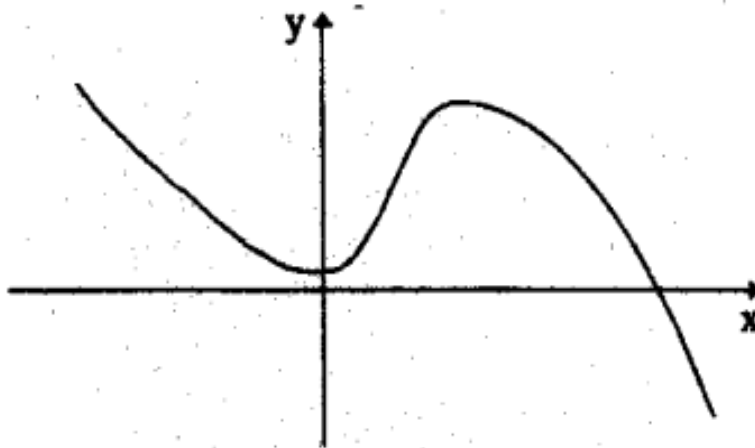
3.   (**8 marks**)
   Consider the curve y=$x^3 - 6x^2 + 9x + 1$.
   i) find the coordinates of any stationary points and determine their nature
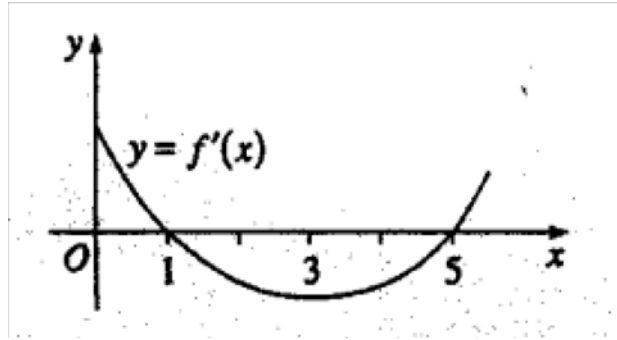   ii) sketch the curve.

4.   (**2 marks**)

   The graph shows a sketch of f(x). On the same set of axis draw a sketch of f'(x),

5.   (**3 marks**)

For what value of x does f(x) have a minimum turning point and Find where f(x) has a point of inflexion and why.

6. (**9 marks**)

For the curve $y=x(x-4)^2$

i) find any stationary points and determine their nature

ii) find the point of inflexion

iii) Draw the graph shwoing all important features.

iv) for what values of x is y concave down for $-1\leq x \leq 5$?

7. (**2 marks**)

Find an equation for the tangent to the curve $y=\frac{\sqrt{x}}{2}$ at x=1.

8. (**3 marks**)

Find an equation for the tangent to the curve $y=\sqrt{(6-2x)^3}$ at x=2.

9. (**2 marks**)

Given the data:

when x<2, f'(x)<0 and f"(x)>0

when x=2,f'(x)=0 and f"(x)=0

when x>2, f'(x)<0 and f"(x)<0

draw a sketch of y=f(x) given that f(2)=0

10. (**3 marks**)

Given that the area of a rectangle is $A=12x-\frac{x^2}{2}$, find the dimension of this rectangle so that its area is a maximum, where its length is twice its width.