**LEVEL 2 ANTIDIFFERENTIATION *ANSWERS***

1. Find the equation of the curve which passes through the point (2, 9) and whose gradient is dy = 2x – 5

 dx

$$y=x^{2}-5x+15$$

2. Find the equation of the curve y = f(x) if the gradient is

 y′ = 6x2 + 8x – 7 and when x = 1, y = 5

$$y=2x^{3}+4x^{2}-7x+6$$

3. Find the equation of the curve y = f(x) if the gradient is f ′(x) = x4 and

f(1) = 0.

(ie when x = 1, y = 0)

$$y=\frac{1}{5}x^{5}-\frac{1}{5}$$

4. Find the equation of the curve whose gradient function is dy = x – x2

 dx

and when x = 1, y = 1

$$y=\frac{1}{2}x^{2}-\frac{1}{3}x^{3}+\frac{5}{6}$$

5(a) If the distance of a car from O is x = 6t2 + 2t + 1

find the velocity equation

ie ***v = dx = 12t + 2***

 ***dt***

and find the acceleration equation.

***ie a = dv = 12***

 ***dt***

(b) The acceleration of a car

 is a = dv = 6t + 1

 dt

 (i) Find the Velocity

 equation given that
 v = 4 m/s when t = 0

$$v=3t^{2}+t+4$$

 (ii) Find the displacement

 equation (ie distance equ)

 given that when t = 0

 the distance from O

 is x = 2 m

$$x=t^{3}+\frac{1}{2}t^{2}+4t+2$$

6. f ′(x) = 6x – 12x2 and the curve passes through the point (2, 4). Find the equation of the curve

y = f(x)

$$f\left(x\right)=3x^{2}-4x^{3}+24$$

 7. Find the antiderivatives.

(a) ***dy = 4x3 – 7x***

 ***dx***

= $x^{4}-\frac{7}{2}x^{2}+c$

***3x + 5x2***

 ***2 4***

(b) ***dy =***

 ***dx***

 = $\frac{3}{4}x^{2}+\frac{5}{12}x^{3}+c$

8. (a) The acceleration of

 an object moving in a line

 is a = 6t – 4

At t = 0, the object is at O moving with a velocity of v = 1 ms-1

Find the velocity equation at time t sec

$$v=3t^{2}-4t+1$$

(b) Find at what times the

 velocity becomes zero.

$t=\frac{1}{3},1$ **seconds**