The curve ***y = f(x)*** passes through (1, 1) and (2, 3) and its gradient is given by :

***y' = ky2*** where ***k*** is some constant.

Solve this differential equation and find ***y*** if ***x*** = 3.

***dy = ky2***

***dx***

***dy***

***y2***

so **∫ = ∫**  ***kdx or* ∫ *y -2 dy* = ∫ *kdx***

so ***- y – 1  = kx + c***

***- 1 = kx + c***

***y***

***subs x = 1, y = 1 : -1 = k + c equ 1***

***subs x = 2, y = 3 : - ⅓ = 2k + c equ 2***

***equ 2 – equ 1 : ⅔ = k***

***sub in equ 1 : -1 = ⅔ + c***

***-1⅔ = c***

***The equ of the curve is : - 1 = ⅔x – 1⅔***

***y***

***If x = 3, - 1 = ⅔×3 – 1⅔***

***y***

***- 1 = 2 – 1⅔***

***y***

***- 1 = 1***

***y 3***

***so y = -3***

8.

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