

# SATPREP

## Assignment :Integrate with initial values

1. $\frac{dy}{dx} = 5x^4 - \sec^2 x$	2. $\frac{dy}{dx} = \sin x - e^{-x} + 8x^3$	3. $\frac{dy}{dx} = \frac{1}{x} - \frac{1}{x^2}, (x > 0)$	4. $\frac{dy}{dt} = 3t^2 \cos(t^3)$
5. $\frac{dy}{dx} = 3 \sin x$ ; $y = 2$ when $x = 0$	6. $\frac{dy}{dx} = 2e^x - \cos x$ ; $y = 3$ when $x = 0$	7. $f'(x) = 7x^6 - 3x^2 + 5$ ; $f(1) = 1$	8. $y' = 10x^9 + 5x^4 - 2x + 4$ ; $y = 6$ when $x = 1$
9. $f'(x) = -\frac{1}{x^2} - \frac{3}{x^4} + 12$ $f(1) = 3$	10. $\frac{dy}{dx} = 5 \sec^2 x - \frac{3}{2} \sqrt{x}$ ; $y _{x=0} = 7$	11. $\frac{dx}{dt} = \frac{1}{t} - \frac{1}{t^2} + 6$ ; $x = 0$ when $t = 1$	12. $\frac{dv}{dt} = 4 \sec t \tan t + e^t + 6t$ ; $v = 5$ when $t = 0$
13. Find the specific solution to the following second-order initial value problem by first finding $\frac{dy}{dx}$ and then finding $y$ :  $\frac{d^2y}{dx^2} = 24x^2 - 10$ . When $x = 1$ , $\frac{dy}{dx} = 3$ and $y = 5$ .		14. Find the specific solution to the following second-order initial value problem by first finding $f'(x)$ and then finding $f(x)$ :  $f''(x) = \cos x - \sin x$ . $f'(0) = 2$ and $f(0) = 0$	

### Answers:

1. $y = x^5 - \tan x + C$	2. $y = -\cos x + e^{-x} + 2x^4 + C$	3. $y = \ln x + x^{-1} + C$	4. $y = \sin(t^3) + C$
5. $y = -3 \cos x + 5$	6. $y = 2e^x - \sin x + 1$	7. $f(x) = x^7 - x^3 + 5x - 4$ ;	8. $y = x^{10} + x^5 - x^2 + 4x + 1$ ; ;
9. $f(x) = x^{-1} + x^{-3} + 12x - 11$	10. $y = 5 \tan x - x^{\frac{3}{2}} + 7$ ; $(0 < x < \frac{\pi}{2})$	11. $x = \ln t + t^{-1} + 6t - 7$ ; $(t > 0)$	12. $v = 4 \sec t + e^t + 3t^2$ ; $(-\frac{\pi}{2} < t < \frac{\pi}{2})$ Note that $C = 0$ .
13. $y = 2x^4 - 5x^2 + 5x + 3$		14. $f(x) = -\cos x + \sin x + x + 1$	

