

## Homework to review integrals and start doing differential equations!

Integrate both sides to find  $y(t)$ :

1.  $\frac{dy}{dt} = t$
2.  $\frac{dy}{dt} = t^2$
3.  $\frac{dy}{dt} = \sqrt{t}$
4.  $\frac{dy}{dt} = e^t$
5.  $\frac{dy}{dt} = 2e^t$
6.  $\frac{dy}{dt} = 4e^{2t}$
7.  $\frac{dy}{dt} = \frac{1}{t}$
8.  $\frac{dy}{dt} = \frac{1}{t+1}$
9.  $\frac{dy}{dt} = \frac{1}{t-1}$
10.  $\frac{dy}{dt} = \frac{1}{t^2}$
11.  $\frac{dy}{dt} = \frac{-1}{t^3}$
12.  $\frac{dy}{dt} = \frac{3}{t}$
13.  $\frac{dy}{dt} = \frac{1}{t-3}$
14.  $\frac{dy}{dt} = \sin t$
15.  $\frac{dy}{dt} = \cos t$
16.  $\frac{dy}{dt} = \sin(2t)$
17.  $\frac{dy}{dt} = \sin t \cos t$
18.  $\frac{dy}{dt} = \frac{1}{1+t^2}$
19. Use partial fractions to find:  $\frac{dy}{dt} = \frac{2}{t(t-4)}$
20. Use partial fractions to find:  $\frac{dy}{dt} = \frac{1}{(t+1)(t-2)}$
21. Use partial fractions to find:  $\frac{dy}{dt} = \frac{3}{t^2+t-2}$
22.  $\frac{dy}{dt} = t^2 + t^3$
23.  $\frac{dy}{dt} = t^2 + t^3 + e^t$

24.  $\frac{dy}{dt} = e^2 + t^3 + e^{-t} + e^{2t} + \sin t$

25. Use the fact that  $y(0) = 0$  and  $\frac{dy}{dt} = t^2 + t^3$  to find  $y(t)$ .

26. Use the fact that  $y(0) = 0$  and  $\frac{dy}{dt} = \frac{1}{t^2}$  to find  $y(t)$ .

27. Use the fact that  $y(1) = 0$  and  $\frac{dy}{dt} = \frac{1}{t}$  to find  $y(t)$ .