

## 6.2 u-substitution practice

make  
a  
u-subst.  
&  
rewrite  
in  
terms  
of  
u

$$1) \int \frac{6 \cos t}{(2 + \sin t)^2} dt = \int 6 \cos t \cdot \frac{1}{(2 + \sin t)^2} dt \quad \begin{cases} u = 2 + \sin t \\ du = \cos t \cdot dt \end{cases}$$

$$= \int \frac{6}{u^2} du = \int 6u^{-2} du = -6u^{-1} + C = \frac{-6}{2 + \sin t} + C$$

$$2) \int \tan x \cdot dx = \int \frac{\sin x}{\cos x} dx \quad \begin{cases} u = \cos x \\ du = -\sin x \cdot dx \\ -du = \sin x \cdot dx \end{cases}$$

$$= \int -\frac{1}{u} \cdot du = -\ln|u| + C = -\ln|\cos x| + C$$

$$3) \int_0^1 10x(5x^2 - 3)^6 dx \quad \begin{cases} u = 5x^2 - 3 \\ du = 10x \cdot dx \end{cases}$$

$$= \int_{-3}^2 u^6 du = \left[ \frac{1}{7} u^7 \right]_{-3}^2 = \frac{1}{7} (2)^7 - \frac{1}{7} (-3)^7$$

$$4) \int_{-3}^3 2x\sqrt{x^2 - 5} dx = \int_4^4 \sqrt{u} du = \boxed{0} \quad \begin{cases} u = x^2 - 5 \\ du = 2x \cdot dx \end{cases}$$

7) Make up your own integral that **can** be simplified by u-substitution

8) Make up your own integral that **cannot** be simplified by u-substitution