

# Homework 34

①  $f(u) = e^{7u} \sin u$

$$f'(u) = 7e^{7u} \sin u + e^{7u} \cos u$$

②  $f(u) = (8u-6)^3 \div (4u+5)^4$

$$\frac{3(8u-6)^2(8)(4u+5)^4 - 4(4u+5)^3(4)(8u-6)^3}{(4u+5)^8} = f'(u)$$

③  $w = (t^2+7)^{80}; \frac{dw}{dt} = ?$

$$w'(t) = 80(t^2+7)^{79}(2t)$$

or  $160t(t^2+7)^{79}$

④  $f(u) = (2u^2+4.9)^{1/4}; \frac{df}{du}$

$$f'(u) = \frac{1}{4}(2u^2+4.9)^{-3/4}(4u)$$

$$\frac{df}{du} = \frac{u}{(2u^2+4.9)^{3/4}}$$

⑤  $f(u) = \cos^4 u + \cos(u^4)$

$$f'(u) = 4\cos^3 u(-\sin u) - 4u^3 \sin(u^4)$$

⑥  $f(u) = 8^{u^2+4u}$

$$f'(u) = \ln(8) \cdot 8^{u^2+4u} (2u+4)$$

$$f'(1) = 8^5 \ln(8)(6)$$

⑧  $f(u) = \cos^5(\sin(4u))$

$$f'(u) = 5\cos^4(\sin(4u))(-\sin(\sin(4u)))$$

$$(\cos(4u)(4))$$

$$f'(u) = -20\cos^4(\sin(4u))(\sin(\sin(4u)))$$

$$\cos(4u) \rightarrow$$

⑦ look at given data and answer based on the chain rule.

⑨  $y = A \sin(\sqrt{\frac{k}{m}} \cdot t)$

① further put  $y = A$  then

$$A = A \sin(\sqrt{\frac{k}{m}} \cdot t); t = \frac{\pi}{2} \sqrt{\frac{m}{k}}$$

② move further at  $y = 0$  then

$$\sin(\sqrt{\frac{k}{m}} \cdot t) = 0; t = \pi \sqrt{\frac{m}{k}}$$

③ same as 1

④ Period is determined by the

$$\text{formula } \frac{dT}{T} = \sqrt{\frac{k}{m}}$$

$$\text{where } T = 2\pi \sqrt{\frac{m}{k}}$$

⑤  $\frac{dT}{dm} = \frac{\pi}{k} \left(\frac{m}{k}\right)^{-1/2}$   $\rightarrow$