Derivatives

You are expected to have the following facts memorized.

1. $\dfrac{d}{dx} x^n = nx^{n-1}$

2. $\dfrac{d}{dx} \sqrt{x} = \dfrac{1}{2\sqrt{x}}$

3. $\dfrac{d}{dx} \ln x = \dfrac{1}{x}$

4. $\dfrac{d}{dx} \log_b x = \dfrac{1}{x} \dfrac{1}{\ln b}$

5. $\dfrac{d}{dx} e^x = e^x$

6. $\dfrac{d}{dx} a^x = a^x \ln a$

7. $\dfrac{d}{dx} \sin x = \cos x,$ $\qquad\qquad\qquad\qquad \dfrac{d}{dx} \cos x = -\sin x$

8. $\dfrac{d}{dx} \tan x = \sec^2 x,$ $\qquad\qquad\qquad\quad \dfrac{d}{dx} \cot x = -\csc^2 x$

9. $\dfrac{d}{dx} \sec x = \sec x \tan x,$ $\qquad\qquad\qquad \dfrac{d}{dx} \csc x = -\csc x \cot x$

10. $\dfrac{d}{dx} \sin^{-1} x = \dfrac{1}{\sqrt{1-x^2}},$ $\qquad\qquad\quad \dfrac{d}{dx} \cos^{-1} x = \dfrac{-1}{\sqrt{1-x^2}}$

11. $\dfrac{d}{dx} \tan^{-1} x = \dfrac{1}{1+x^2},$ $\qquad\qquad\quad\; \dfrac{d}{dx} \cot^{-1} x = \dfrac{-1}{1+x^2}$

12. $\dfrac{d}{dx} \sec^{-1} x = \dfrac{1}{|x|\sqrt{x^2-1}},$ $\qquad\qquad \dfrac{d}{dx} \csc^{-1} x = \dfrac{-1}{|x|\sqrt{x^2-1}}$

13. $\dfrac{d}{dx} \sinh x = \cosh x,$ $\qquad\qquad\qquad\quad \dfrac{d}{dx} \cosh x = \sinh x$