

MTH 162 Homework 6

Do the first five problems. Due: Feb 26, 2014 (Wednesday). Hand in to me during the class.

**Compulsory:**

**Ex 5.7**

**26–41** ■ Find the derivative. Simplify where possible.

**28.**  $g(x) = \cosh(\ln x)$

**36.**  $y = \sinh^{-1}(\tan x)$

**53–61** Evaluate the integral.

**57.**  $\int \frac{\cosh x}{\cosh^2 x - 1} dx$

**59.**  $\int_4^6 \frac{1}{\sqrt{t^2 - 9}} dt$

**61.**  $\int \frac{e^x}{1 - e^{2x}} dx$

**Recommended:** (These types of questions may also appear in the exams)

**Ex 5.7**

**26–41** ■ Find the derivative. Simplify where possible.

26.  $f(x) = \tanh(1 + e^{2x})$

27.  $f(x) = x \sinh x - \cosh x$

28.  $g(x) = \cosh(\ln x)$

29.  $h(x) = \ln(\cosh x)$

30.  $y = x \coth(1 + x^2)$

31.  $y = e^{\cosh 3x}$

32.  $f(t) = \operatorname{csch} t(1 - \ln \operatorname{csch} t)$

33.  $f(t) = \operatorname{sech}^2(e^t)$

34.  $y = \sinh(\cosh x)$

35.  $G(x) = \frac{1 - \cosh x}{1 + \cosh x}$

36.  $y = \sinh^{-1}(\tan x)$

37.  $y = \cosh^{-1}\sqrt{x}$

38.  $y = x \tanh^{-1}x + \ln \sqrt{1 - x^2}$

39.  $y = x \sinh^{-1}(x/3) - \sqrt{9 + x^2}$

40.  $y = \operatorname{sech}^{-1}(e^{-x})$

41.  $y = \coth^{-1}(\sec x)$

**53–61** Evaluate the integral.

53.  $\int \sinh x \cosh^2 x \, dx$

54.  $\int \sinh(1 + 4x) \, dx$

55.  $\int \frac{\sinh \sqrt{x}}{\sqrt{x}} \, dx$

56.  $\int \tanh x \, dx$

57.  $\int \frac{\cosh x}{\cosh^2 x - 1} \, dx$

58.  $\int \frac{\operatorname{sech}^2 x}{2 + \tanh x} \, dx$

60.  $\int_0^1 \frac{1}{\sqrt{16t^2 + 1}} dt$

**Challenging** (Attempt if you are interested)

42. Show that  $\frac{d}{dx} \sqrt[4]{\frac{1 + \tanh x}{1 - \tanh x}} = \frac{1}{2}e^{x/2}$ .

43. Show that  $\frac{d}{dx} \arctan(\tanh x) = \operatorname{sech} 2x$ .