Homework 2

Logs

7. Solve the following for x.
   a. $\log_3(x) = 5$
   b. $\log_3(x-2) - \log_3(5-x) = 2$

2. Simplify the following.
   a. $\log_2(\sqrt{x})$

e. $\log_2\left(\sqrt{\frac{x^4}{y^2}}\right)$

Derivatives

2. **WE10** Differentiate the following.
   a. $y = e^{6x-2}$
   b. $y = e^{8-6x}$

5. **WE11** Differentiate the following.
   a. $f(x) = 2(e^x + 1)$
   b. $f(x) = 3e^{2x}(e^x + 1)$

4. **WE5** Differentiate each of the following with respect to x.
   a. $y = \log_e(2x+5)$
   b. $y = \log_e(6x+1)$

e. $y = \log_e(x^3 + 2x^2 - 7x)$

f. $y = \log_e(x^2 - 2x^3 + x^4)$

c. $y = \ln\left(\sqrt{x^2+2}\right)$

d. $y = \ln\ (x+3)^{\frac{1}{4}}$

2. Differentiate each of the following.
   a. $y = \cos(3x)$

3. Differentiate each of the following.
   a. $y = \sin(2x + 3)$

5. Determine the derivative of each of the following.
   a. $y = \cos(x^2 - 4x + 3)$
   b. $y = \sin(10 - 5x + x^2)$

1. **WE1** Differentiate each of the following functions.
   a. $y = (5x - 4)^3$
   b. $y = \sqrt{3x + 1}$

a. $f(x) = 3\cos(x^2 - 1)$
b. $f(x) = 5e^{3x^2 - 1}$

1. **WE4** For each of the following functions, determine the derivative function.
   a. $f(x) = \sin(3x)\cos(3x)$
   b. $f(x) = x^2 e^{3x}$

Anti differentiation

c. $\int (3x^2 + 5x - 8)\, dx$

d. $\int (2x^3 + 3x^2 - 6x - 9)\, dx$

6. Determine:
   a. $\int (x^4 - e^{-4x}) dx$
   b. $\int \left(\frac{1}{2} e^{2x} - \frac{2}{3} e^{-\frac{x}{2}} \right) dx$

3. Determine the following.

a. $\int \frac{8}{5x+6}\mathrm{d}x$

b. $\int \frac{3}{2x-5}\mathrm{d}x$

4. **WE9** Determine the indefinite integral of:

a. $e^{4x} + \sin(2x) + x^3$

b. $3x^2 - 2\cos(2x) + 6e^{3x}$

5. Determine:

a. $\int (\sin(x) + \cos(x))\mathrm{d}x$

b. $\int (\sin(2x) - \cos(x))\mathrm{d}x$