

Trigonometric, logarithmic and exponential functions.

Differentiation.

1.  $\tan(x) = \sin(x)/\cos(x)$ , find  $\tan(x)'$ .

2. Differentiate:

a)  $\sin(5x)$

b)  $\cos(x^3)$

c)  $(\sin(x-2) + 3\cos(x^2))^3$

d)  $\ln(x^3 + 3)$

e)  $(1 + \ln(x^2 + 1))\cos(x^3)$

f)  $e^{10x}$

g)  $\exp(x^3 + \sin(x))$

3. Find a solution to the equation  $y'' = -y$

4. Find a solution to the previous equation such that  $y(0) = 1$  and  $y'(0) = 2$

Integration.

5. Calculate the integrals:

a)  $\int e^{5x} dx$

b)  $\int xe^{-x^2} dx$

c)  $\int \sin(x^2)2x dx$

d)  $\int dx/(x+1)$

e)  $\int x^2 dx/(x^3 + 3)$

f)  $\int x^3 e^x dx$

g)  $\int e^{x+e^x} dx$

h)  $\int x^2 \cos(x) dx$