1 Calculus

Differentiate the following:

$$1 - 3\tan(x+1) \tag{1}$$

$$\frac{1}{\sin(\sin(x))} \tag{2}$$

$$\ln\left(\frac{1}{\cot(x)}\right) \tag{3}$$

$$\cot\left(\tan\left(\frac{1}{x}\right)\right) \tag{4}$$

$$\tan(\cos(\ln(x))) \tag{5}$$

$$\frac{1}{\tan(\sec(x))} \tag{6}$$

$$\frac{1}{\ln(\ln(x))} \tag{7}$$

$$\ln(\tan(\ln(x))) \tag{8}$$

$$e^{\cos(\sec(x))} \tag{9}$$

$$\cot(\ln(\cos(x))) \tag{10}$$

$$\sin(x) \tag{11}$$

$$\sin\left(\frac{1}{(-8x-3)^7}\right) \tag{12}$$

$$-10e^x - 10 \tag{13}$$

$$\frac{1}{\sin^6\left(\frac{1}{x}\right)} \tag{14}$$

$$\frac{1}{\tan(x^6)} \tag{15}$$

$$\ln(\cot(e^x)) \tag{16}$$

$$\sin\left(\sin\left(x^4\right)\right) \tag{17}$$

$$\cos(\sin(\cos(x))) \tag{18}$$

$$e^{7-5\csc(x)} \tag{19}$$

$$\frac{1}{\tan(x^3)} \tag{20}$$

2 Matrices

Find the inverse of the following:

$$\begin{bmatrix} -7 & -9 & -8 \\ -5 & -3 & 0 \\ 0 & -3 & 1 \end{bmatrix} \tag{21}$$

$$\begin{bmatrix} 7 & -7 & -7 \\ 5 & -4 & -8 \\ -3 & 8 & 1 \end{bmatrix} \tag{22}$$

$$\begin{bmatrix} -2 & 7 & -6 \\ -5 & -3 & 1 \\ 7 & 9 & -3 \end{bmatrix} \tag{23}$$

$$\begin{bmatrix} -5 & 1 & 3 \\ -9 & 1 & -9 \\ -3 & 2 & -8 \end{bmatrix} \tag{24}$$

$$\begin{bmatrix} -6 & -5 & -8 \\ -4 & -2 & 9 \\ 8 & -3 & -9 \end{bmatrix} \tag{25}$$

$$\begin{bmatrix} 3 & 2 & 6 \\ -3 & -5 & 5 \\ -2 & 0 & -3 \end{bmatrix} \tag{26}$$

$$\begin{bmatrix} -7 & -7 & -9 \\ -7 & 4 & 8 \\ -7 & -8 & -9 \end{bmatrix} \tag{27}$$

$$\begin{bmatrix} -5 & -5 & -2 \\ -4 & 2 & 7 \\ -5 & -3 & 5 \end{bmatrix} \tag{28}$$

$$\begin{bmatrix} 6 & -1 & 0 \\ 2 & -8 & 6 \\ -6 & 3 & 6 \end{bmatrix} \tag{29}$$

$$\begin{bmatrix} -5 & -2 & -4 \\ -8 & 5 & 1 \\ -4 & -5 & -2 \end{bmatrix} \tag{30}$$

3 Algebra

Expand the following:

$$(x-7)(x-6)(x+6) \tag{31}$$

$$(x-4)(x+4)(x+8) \tag{32}$$

$$(x-6)(x-1)(x+7) \tag{33}$$

$$(x-2)(x-1)(x+6) \tag{34}$$

$$(x-9)(x-5)(x+6) \tag{35}$$

$$(x-6)(x-4)(x+5) \tag{36}$$

$$(x-9)(x-7)(x+7) \tag{37}$$

$$(x-8)(x-5)(x+3) \tag{38}$$

$$(x-4)^2(x+7) \tag{39}$$

$$(x+2)(x+4)(x+8) \tag{40}$$