1 Differenciation

Differenciate the following expressions:

$$\ln\left(\ln\left(\sin\left(x\right)\right)\right) \tag{1}$$

$$\tan\left(\csc\left(\frac{1}{x^5}\right)\right) \tag{2}$$

$$\sec\left(x^3\right) \tag{3}$$

$$e^{e^{\cos\left(x\right)}} \tag{4}$$

$$\ln\left(\sin\left(\ln\left(x\right)\right)\right) \tag{5}$$

$$\csc\left(\ln\left(x\right)^3\right) \tag{6}$$

$$5\cot\left(x^5\right) - 5 \tag{7}$$

$$\sin\left(\ln\left(\ln\left(x\right)\right)\right) \tag{8}$$

$$\cos\left(e^{\sin\left(x\right)}\right) \tag{9}$$

$$\cos\left(\sin\left(\cos\left(x\right)\right)\right) \tag{10}$$

$$\sin\left(\frac{1}{x}\right) \tag{11}$$

$$\tan^5\left(\ln\left(x\right)\right) \tag{12}$$

$$\frac{1}{\left(6\sin\left(x\right) - 8\right)^2} \tag{13}$$

$$\tan\left(e^{\frac{1}{x^{10}}}\right) \tag{14}$$

$$\sin^{72}\left(x\right) \tag{15}$$

$$\frac{1}{\left(5x + 3\right)^{15}} \tag{16}$$

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

$$-\sin\left(3\cot\left(x\right) + 5\right) \tag{18}$$

$$\ln\left(\tan\left(\tan\left(x\right)\right)\right) \tag{19}$$

$$e^{\cot\left(x^2\right)} \tag{20}$$

2 Matrices

Calculate the inverse of the following:

$$\begin{bmatrix} -1 & 3 & 4 \\ 3 & 8 & 5 \\ 6 & 6 & 1 \end{bmatrix} \tag{21}$$

$$\begin{bmatrix} -3 & 6 & 3 \\ 1 & 5 & -1 \\ 6 & -3 & 1 \end{bmatrix} \tag{22}$$

$$\begin{bmatrix} 3 & -3 & 8 \\ 8 & -5 & -9 \\ -6 & 5 & -3 \end{bmatrix} \tag{23}$$

$$\begin{bmatrix} -1 & 1 & 3 \\ -5 & -8 & 6 \\ 8 & -8 & -8 \end{bmatrix} \tag{24}$$

$$\begin{bmatrix} 7 & -3 & 3 \\ -7 & -8 & -2 \\ -3 & 2 & -2 \end{bmatrix} \tag{25}$$

$$\begin{bmatrix} 9 & 2 & -1 \\ -3 & -2 & 9 \\ -9 & 4 & 7 \end{bmatrix} \tag{26}$$

$$\begin{bmatrix} -8 & 5 & -9 \\ 5 & 2 & 6 \\ 8 & 8 & 6 \end{bmatrix} \tag{27}$$

$$\begin{bmatrix} 9 & -3 & 4 \\ 5 & 8 & 1 \\ -1 & 1 & -1 \end{bmatrix} \tag{28}$$

$$\begin{bmatrix} -1 & 7 & -2 \\ 1 & 5 & -9 \\ 8 & -4 & 3 \end{bmatrix} \tag{29}$$

$$\begin{bmatrix} 9 & -6 & 7 \\ -3 & -6 & 5 \\ 0 & 9 & 2 \end{bmatrix} \tag{30}$$