

1 Differentiation

Differentiate the following expressions:

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

$$\sec(\cot(e^x)) \quad (2)$$

$$e^{\cos(\sin(x))} \quad (3)$$

$$\frac{1}{\sec(\tan(x))} \quad (4)$$

$$-4 \sin(x^9) - 9 \quad (5)$$

$$\tan(\cos(\cos(x))) \quad (6)$$

$$\sec(\sin(x^7)) \quad (7)$$

$$\tan^{18}(x) \quad (8)$$

$$\sec(e^{\csc(x)}) \quad (9)$$

$$\frac{1}{\ln(x)^{20}} \quad (10)$$

$$\frac{1}{6e^x - 9} \quad (11)$$

$$\frac{1}{\ln(e^x)} \quad (12)$$

$$e^{\tan(x^7)} \quad (13)$$

$$\sec(\tan(5x + 6)) \quad (14)$$

$$\tan(\ln(\sec(x))) \quad (15)$$

$$\csc^4(\cot(x)) \quad (16)$$

$$3 - 6 \sec(\sin(x)) \quad (17)$$

$$\tan(\sin(\ln(x))) \quad (18)$$

$$\tan(x) \quad (19)$$

$$-5 \csc\left(\frac{1}{x}\right) - 10 \quad (20)$$

2 Matrices

Calculate the inverse of the following:

$$\begin{bmatrix} -5 & -6 & 1 \\ 8 & -4 & 9 \\ 8 & 0 & -4 \end{bmatrix} \quad (21)$$

$$\begin{bmatrix} -3 & -6 & -2 \\ 0 & 9 & -9 \\ -8 & 5 & 9 \end{bmatrix} \quad (22)$$

$$\begin{bmatrix} 7 & -5 & 2 \\ -5 & 2 & 7 \\ 1 & -5 & -9 \end{bmatrix} \quad (23)$$

$$\begin{bmatrix} 4 & 3 & 5 \\ 0 & 7 & 8 \\ 6 & 6 & -6 \end{bmatrix} \quad (24)$$

$$\begin{bmatrix} -8 & -5 & -8 \\ -6 & -7 & -9 \\ -9 & -5 & 3 \end{bmatrix} \quad (25)$$

$$\begin{bmatrix} 8 & 5 & -7 \\ -6 & 8 & 7 \\ 2 & 6 & 1 \end{bmatrix} \quad (26)$$

$$\begin{bmatrix} 5 & 9 & -7 \\ 2 & 6 & 7 \\ 7 & 4 & -1 \end{bmatrix} \quad (27)$$

$$\begin{bmatrix} 1 & -8 & -6 \\ 4 & -1 & 0 \\ 6 & -5 & 9 \end{bmatrix} \quad (28)$$

$$\begin{bmatrix} -7 & 4 & 9 \\ -4 & -5 & 2 \\ -1 & -8 & -5 \end{bmatrix} \quad (29)$$

$$\begin{bmatrix} 3 & -2 & -2 \\ 8 & 8 & 4 \\ -9 & -2 & 9 \end{bmatrix} \quad (30)$$