1 Calculus

Differentiate the following:

$$4 - 2x \tag{1}$$

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

$$\sec\left(4 + \frac{2}{x^4}\right) \tag{3}$$

$$e^{\tan(\ln(x))} \tag{4}$$

$$\frac{1}{\ln\left(\frac{1}{x}\right)} \tag{5}$$

$$\frac{1}{\sin(\cos(x))} \tag{6}$$

$$\frac{1}{\sin(e^x)} \tag{7}$$

$$(12x - 9)^6 \tag{8}$$

$$\sin\left(\cos^2(x)\right) \tag{9}$$

$$2\sin(\sin(x)) - 1 \tag{10}$$

2 Matrices

Find the inverse of the following

$$\begin{bmatrix} 6 & -6 & -4 \\ 7 & -5 & 3 \\ 5 & -6 & -4 \end{bmatrix} \tag{11}$$

$$\begin{bmatrix} -1 & 8 & 8 \\ -8 & -4 & -3 \\ 0 & -4 & 2 \end{bmatrix} \tag{12}$$

$$\begin{bmatrix} -5 & -1 & 6 \\ -5 & -4 & -5 \\ -2 & 6 & -3 \end{bmatrix} \tag{13}$$

$$\begin{bmatrix} 3 & 7 & 9 \\ -5 & -7 & 5 \\ 5 & -1 & 5 \end{bmatrix} \tag{14}$$

$$\begin{bmatrix} -2 & -2 & 1 \\ -8 & 8 & -9 \\ 3 & 2 & -2 \end{bmatrix} \tag{15}$$

$$\begin{bmatrix} -9 & -7 & -9 \\ -2 & 7 & -5 \\ 0 & -6 & -5 \end{bmatrix} \tag{16}$$

$$\begin{bmatrix} -8 & -3 & -6 \\ -2 & 8 & 8 \\ -4 & -7 & -1 \end{bmatrix} \tag{17}$$

$$\begin{bmatrix} 2 & 2 & -7 \\ 5 & -2 & 8 \\ 4 & -6 & -6 \end{bmatrix} \tag{18}$$

$$\begin{bmatrix} -8 & 5 & 8 \\ -7 & 7 & -3 \\ 5 & 2 & 4 \end{bmatrix} \tag{19}$$

$$\begin{bmatrix} 3 & -7 & -3 \\ -1 & 7 & 1 \\ 9 & 9 & 3 \end{bmatrix} \tag{20}$$

3 Algebra

Expand the following:

$$(x - 9)(x + 3)(x + 7) \tag{21}$$

$$(x + 5)(x + 7)^2 \tag{22}$$

$$(x - 10)(x + 2)(x + 4) \tag{23}$$

$$(x - 1)(x + 5)(x + 7) \tag{24}$$

$$(x - 9)(x + 2)(x + 3) \tag{25}$$

$$(x - 10)(x - 4)(x - 3) \tag{26}$$

$$(x - 8)(x - 7)(x + 7) \tag{27}$$

$$(x - 5)(x + 4)(x + 7) \tag{28}$$

$$(x + 3)(x + 5)(x + 6) \tag{29}$$

$$(x - 5)(x - 4)(x + 1) \tag{30}$$