

6. (a) Consider the real valued function $f(x) = x^{\frac{2}{3}} - 2x^{\frac{1}{3}}$, on its largest domain.
- Find and classify the extrema of the function f .
 - Locate *all* points of inflexion on the graph of f .
- (b) A 10 metre ladder is leaning against a vertical wall, and its base is slipping away from the wall at a steady rate of 1 metre per minute. At what rate is the top of the ladder sliding down the wall, when the base is at each of the distances 1, 2, 3 and 9 meters from the base of the wall.
7. (a) The force \mathbf{F} is specified by $2\mathbf{i} + \mathbf{j} - 2\mathbf{k}$ newtons.
- What is the magnitude of this force? [ie. the length of the vector \mathbf{F}]
 - What is the vector component of this force (resolved part of the force) in the direction of the vector $\mathbf{a} = \mathbf{i} + \mathbf{j} + \mathbf{k}$?
 - What is the component of this force perpendicular to the vector \mathbf{a} ?
 - Suppose that the force \mathbf{F} acts on a point P , whose position vector is $\mathbf{p} = \mathbf{i} + \mathbf{k}$. What then is the moment of the force \mathbf{F} (torque) about the point Q whose position vector is $\mathbf{q} = \mathbf{i} + \mathbf{j}$?
- (b) Find the volume of the parallelepiped, one of whose vertices is the origin, and with edges linking the origin to the points (coordinates in metres):
- $$\begin{pmatrix} 1 \\ 2 \\ 2 \end{pmatrix} \quad \begin{pmatrix} 1 \\ 0 \\ 3 \end{pmatrix} \quad \begin{pmatrix} 7 \\ 2 \\ -1 \end{pmatrix}$$
- (c) Find the point of intersection of the following line and plane.
- The plane passes through the points $(3, 3, 4)$, $(3, 1, 2)$ and $(1, 0, 0)$.
 - The line passes through the points $(3, 5, 8)$ and $(7, 13, 22)$.

HELP ME Please im so confused.

Questions 6 and 7 Thanks