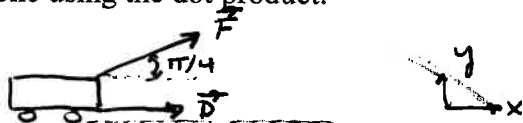


Calculus III
Math 241-002
Fall 2025
Quiz 1

Name Solution

A wagon is pulled 70 ft along a horizontal path by a force of $50\sqrt{2}$ lb. The handle of the wagon is held at an angle of $\pi/4$ above the horizontal. Write the force and distance vectors and calculate the work done using the dot product.



$$\vec{F} = 50\sqrt{2} \left(\cos \frac{\pi}{4} \hat{i} + \sin \frac{\pi}{4} \hat{j} \right) \text{ lb}$$

$$\vec{D} = 70 \hat{i} \text{ ft}$$

$$W = \vec{F} \cdot \vec{D} = (50\sqrt{2} \cos \frac{\pi}{4}) 70 + 0$$

$$= 3500\sqrt{2} \left(\frac{\sqrt{2}}{2} \right) = 3500 \text{ ft} \cdot \text{lb}$$