

INSTRUCTIONS:

This quiz is open-book, open-note, and you may work with your classmates.

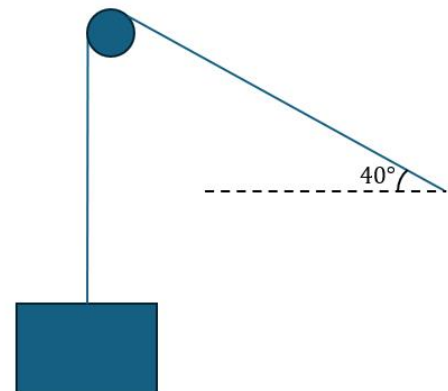
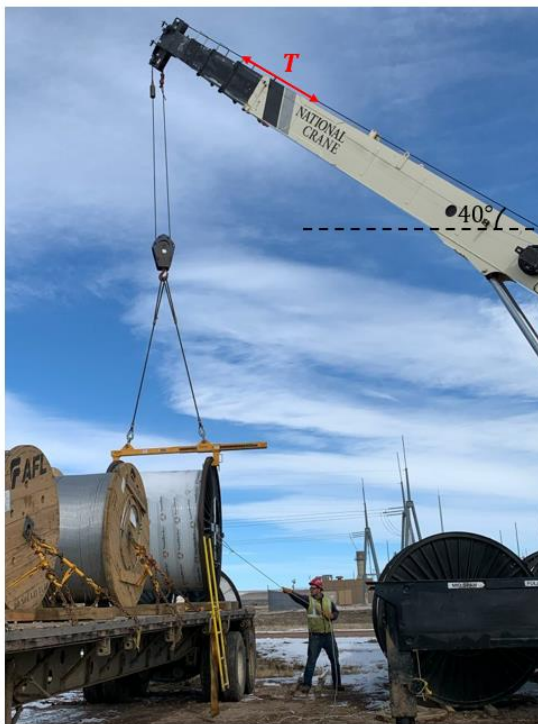
Please answer all questions on your individual papers and submit to me by the end of today's class period.

GIVEN:

A crane is lifting a 500 kg load. The tension in the cable is represented by the force vector T , which makes a 40° angle with the horizontal. Assume all contact is frictionless.

FIND:

- 1) (20 points) Draw a Free-Body Diagram (FBD) of the crane cable, simplifying the load as a point mass with a weight acting straight downwards. Use the diagram provided on the right below.



- 2) (20 points) Assume the acceleration due to gravity is $g = 9.8 \text{ m/s}^2$. Determine the weight of the 500 kg load.

3) (20 points) Determine the magnitude of \mathbf{T} .

4) (20 points) Resolve the force vector T into its Cartesian components T_x and T_y .

5) (20 points) Represent \mathbf{T} in Cartesian vector form.

BONUS: (5 points) Find the unit vector that points in the direction of \mathbf{T} .