Clave

PrepaTec Departamento de ciencias PrepaTec Toluca Tecnológico de Monterrey	Energy & Transformation PC 6046 Grupo:	Professor: Alejandro Portales
	Partial Exam	February 14, 2022
	Name: Alejandro Portales	
	ID:	
	A	
	Points	

1) Find the angles and magnitude of the following vector

A= (69, -54, 63)

$\|A\| = 107.91$

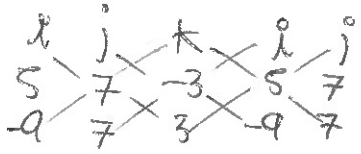
$\theta_x = 50.25°$

$\theta_y = 120.02°$

$\theta_z = 54.28°$

2) Find the cross and dote product of the following two vectors.

A= (5, 7, -3) B= (-9, 7, 3)



$i = 42i$

$j = 12j$

$k = 98k$

$A \cdot B = -5$

3) Find the angle between the two given vectors

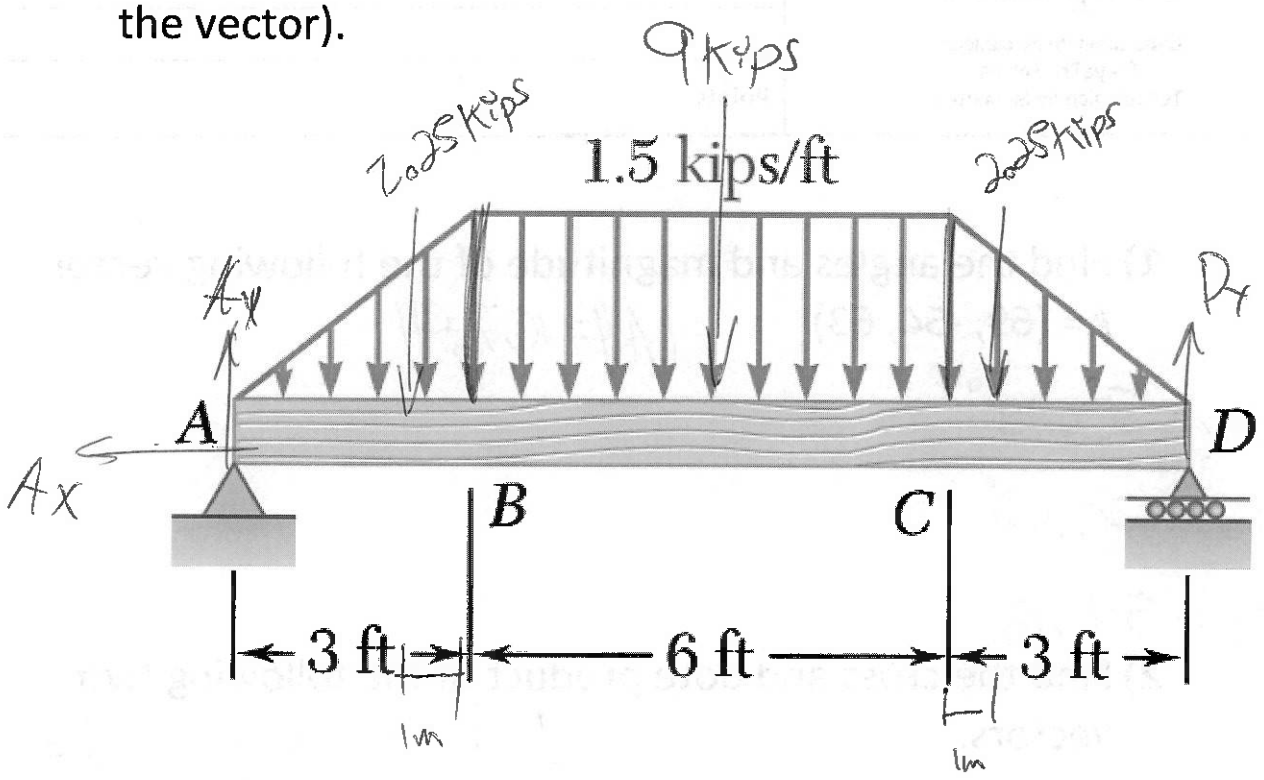
A= (12, 9, -10) B= (17, -16, 3)

$A \cdot B = \left(\frac{30}{\|A\| \|B\|}\right) = 85.94°$

$\cos^{-1}$

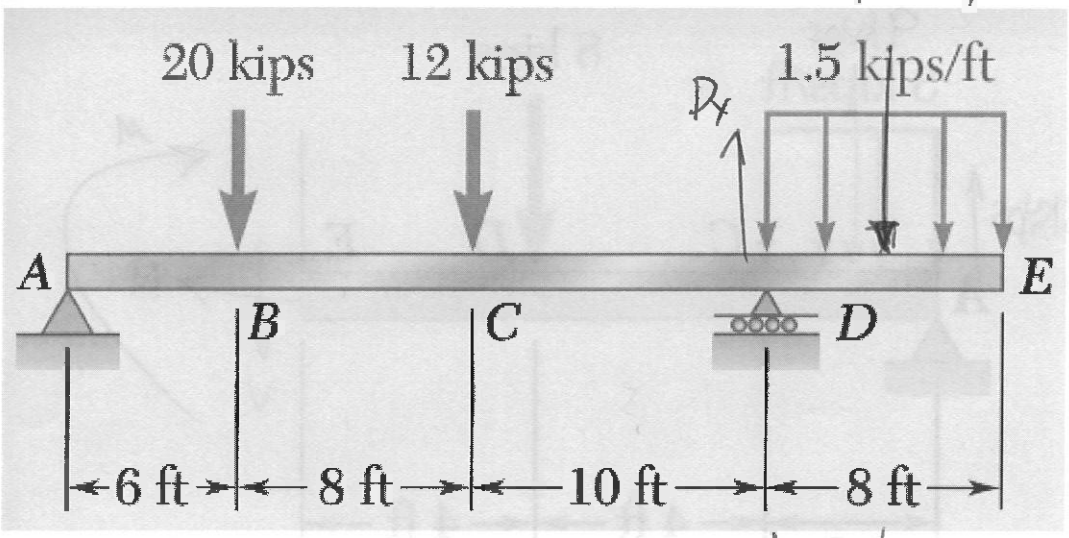
$x = 94.05°$

4) Draw the complete FBD for the following exercise, showing the resultant forces made by the distributed force, and the reaction force of the two supports (just the vector).



5) Prove the reaction force in D is equal to 26kips

12 Kips



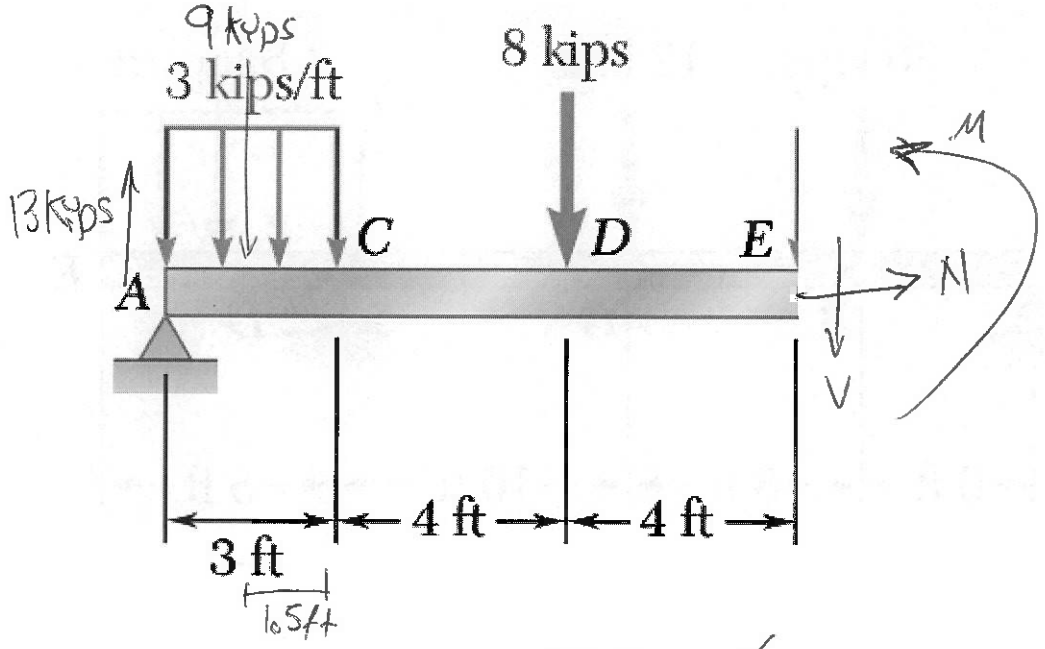
$\Sigma M_A = \emptyset$

$-20(6) - 12(14) + D_y(24) - 12(28) = \emptyset$

$-624 + D_y(24) = \emptyset$

$D_y = 26 \text{ Kips}$

6) Assume the reaction in A is equal to 13kips, calculate normal, shear and momentum in E of the following cut.



$\Sigma F_x = \emptyset$

$N = \emptyset$

$\Sigma F_y = \emptyset$

$13 - 9 - 8 - V = \emptyset$

$V = -4 \text{ kips}$

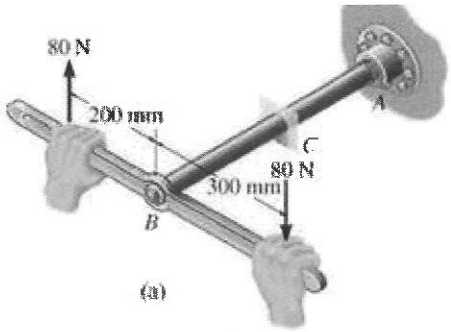
$\Sigma M_E = \emptyset$

$M + 8(4) + 9(9.5) - 13(11) = \emptyset$

$M = 25.5 \text{ N·m}$

EXTRA (5pts)

7) Find the total Torsion in C



$T = 40\ N \cdot m$