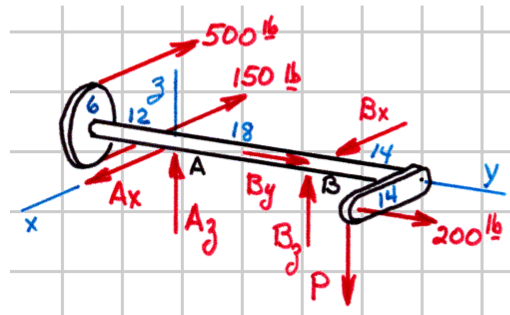
1-81*



Draw a free-body diagram of the shaft.
The moment equation of equilibrium

$$\Sigma \mathbf{M}_A = \mathbf{0}:$$

$$(18\mathbf{j}) \times \left(B_x\mathbf{i} + B_y\mathbf{j} + B_z\mathbf{k}\right) + (14\mathbf{i} + 32\mathbf{j}) \times (200\mathbf{j} - P\mathbf{k})$$
$$+(-12\mathbf{j} + 6\mathbf{k}) \times (-500\mathbf{i}) + (-12\mathbf{j} - 6\mathbf{k}) \times (-150\mathbf{i}) = \mathbf{0}$$

has components

x: $\quad 18B_z - 32P = 0 \qquad B_z = 266.667 \text{ lb} \cong 267 \text{ lb}$ .... **Ans.**

y: $\quad -14P - 3000 + 900 = 0 \qquad P = 150 \text{ lb}$ .... **Ans.**

z: $\quad -18B_x + 2800 - 6000 - 1800 = 0 \qquad B_x = -277.778 \text{ lb} \cong 278 \text{ lb}$ .... **Ans.**

Then the x-, y-, and z-components of the force equilibrium equation give

x: $\quad A_x + (-277.778) - 500 - 150 = 0 \qquad A_x = 928 \text{ lb}$ .... **Ans.**

y: $\quad 200 + B_y = 0 \qquad B_y = -200 \text{ lb}$ .... **Ans.**

z: $\quad A_z + (266.667) - (150) = 0 \qquad A_z = -116.7 \text{ lb}$ .... **Ans.**