PROB. 14-26

$W = 12\ LB, \quad \vec{v}_0 = (40)\hat{i} + (-30)\hat{j} + (-1200)\hat{k}\ \frac{ft}{s}$

$W_A = 4\ LB, \quad W_B = 3\ LB, \quad W_C = 5\ LB$

FIND v_A, v_B, v_C

$W\vec{v}_0 = W_A\vec{v}_A + W_B\vec{v}_B + W_C\vec{v}_C$

$\vec{v}_A = \left(-\frac{5}{13}v_A\right)\hat{i} + \left(-\frac{12}{13}v_A\right)\hat{k}\ \frac{ft}{s}$

$\vec{v}_B = \left(\frac{2}{3}v_B\right)\hat{i} + \left(\frac{1}{3}v_B\right)\hat{j} + \left(-\frac{2}{3}v_B\right)\hat{k}\ \frac{ft}{s}$

$\vec{v}_C = \left(-\frac{3}{5}v_C\right)\hat{j} + \left(-\frac{4}{5}v_C\right)\hat{k}\ \frac{ft}{s}$

$(12)\left[(40)\hat{i} + (-30)\hat{j} + (-1200)\hat{k}\right]$

$= (4)\left[\left(-\frac{5}{13}v_A\right)\hat{i} + \left(-\frac{12}{13}v_A\right)\hat{k}\right]$

$+ (3)\left[\left(\frac{2}{3}v_B\right)\hat{i} + \left(\frac{1}{3}v_B\right)\hat{j} + \left(-\frac{2}{3}v_B\right)\hat{k}\right]$

$+ (5)\left[\left(-\frac{3}{5}v_C\right)\hat{j} + \left(-\frac{4}{5}v_C\right)\hat{k}\right]$

X-DIRECTION: $480 = -1.538v_A + 2v_B$

Y-DIRECTION: $-360 = v_B - 3v_C$

Z-DIRECTION: $-14{,}400 = -3.692v_A - 2v_B - 4v_C$

$\boxed{v_A = 2097\ \frac{ft}{s},\ v_B = 1853\ \frac{ft}{s},\ v_C = 738\ \frac{ft}{s}}$