65. Although it is expected that the boat will have a slight downward recoil (of brief duration) from the upward component of the father's leap, the problem's intent is to concentrate only on the horizontal components, since – if the effects of friction are small – the boat can continue moving horizontally for a significant time. Mass, velocity and momentum units are SI. We use coordinates with $+x$ eastward and $+y$ northward. Angles are positive if measured counterclockwise from the $+x$ axis. Using magnitude-angle notation, momentum conservation is expressed as

$$\begin{aligned} \vec{p}_0 &= \vec{p}_\mathrm{c} + \vec{p}_\mathrm{f} + \vec{p}_\mathrm{b} \\ (0 \angle 0^\circ) &= (80 \angle 0^\circ) + (90 \angle -90^\circ) + \vec{p}_\mathrm{b} \end{aligned}$$

where it must be stressed that the relevant component of the father's momentum is $\vec{p}_\mathrm{f} = (75)(1.5)\cos 37^\circ$ *south* (represented as $(90 \angle -90^\circ)$ in the expression above). Thus, we obtain $\vec{p}_\mathrm{b} = (120 \angle 132^\circ)$, which implies that the boat's (horizontal) velocity is $|\vec{p}|/m = 120/100 = 1.2$ m/s at an angle of 132° counterclockwise from east; this can also be expressed as 48° north of west.